

AHRQ Training Webinar on the Clinical Decision Support Authoring Tool

Presented by:

Sharon Sebastian, CDS Connect Project Lead, MITRE

Chris Moesel, CDS Connect Technical Lead, MITRE

Moderated by:

Edwin Lomotan, MD

Agency for Healthcare Research and Quality

February 7, 2019



Agenda

- Welcome and Introductions
- Presentations
- CDS Authoring Tool Demonstration
- Q&A Session With Presenters

Note: After today's webinar, a copy of the slides will be emailed to all participants.

Presenters and Moderator



Sharon Sebastian RN-BC, MS

- Principal Clinical Informaticist, MITRE
- CDS Connect Project Lead



Chris Moesel

- Principal Software Systems Engineer, MITRE
- CDS Connect Technical Lead
- CDS Authoring Tool Lead

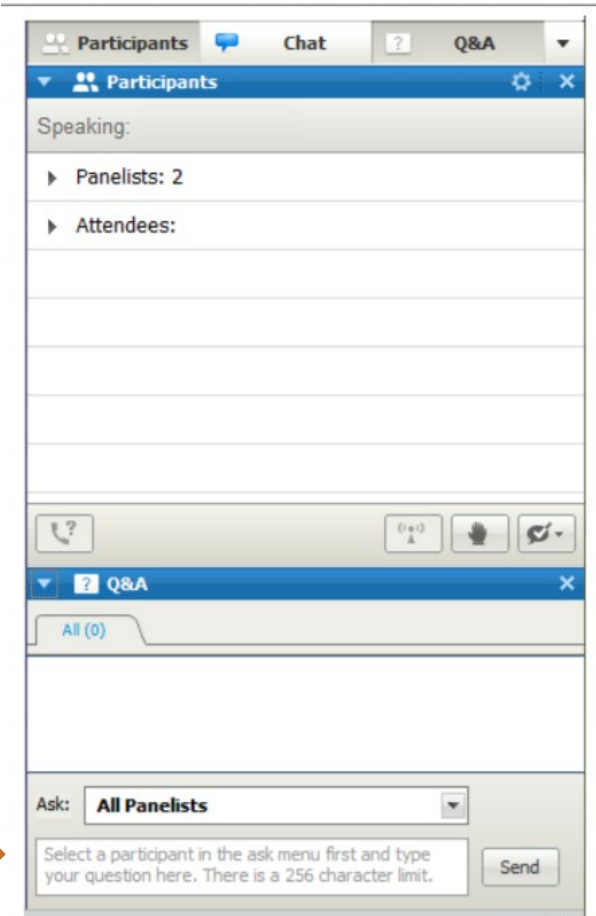


Ed Lomotan, MD

- Medical Officer
- Chief of Clinical Informatics, Center for Evidence and Practice Improvement, AHRQ

How to Submit a Question

- At any time during the presentation, type your question into the “Q&A” section of your WebEx Q&A panel.
- Please address your questions to “All Panelists” in the drop-down menu.
- Select “Send” to submit your question to the moderator.
- Questions will be read aloud by the moderator.



The screenshot shows the WebEx Q&A interface. At the top, there are tabs for 'Participants', 'Chat', and 'Q&A'. The 'Q&A' tab is selected. Below the tabs, there is a 'Participants' section with a 'Speaking:' area and a list of participants. The 'Q&A' section is below the participants list. It has a title bar 'Q&A' and a 'All (0)' tab. Below the tab is a large text area for asking questions. At the bottom of the Q&A section, there is a dropdown menu labeled 'Ask:' with 'All Panelists' selected. Below the dropdown is a text box with the placeholder text 'Select a participant in the ask menu first and type your question here. There is a 256 character limit.' and a 'Send' button.



Learning Objectives

At the conclusion of this activity, participants should be able to:

1. Develop logic, including inclusion and exclusion statements, and define the recommended intervention.
2. Discuss how to develop “base elements” that can be re-used across logic statements, along with features that enable users to develop subpopulations and how to handle errors.
3. Use synthetic test data to verify that authored CDS logic works as expected.
4. Save and download their logic expression and provide an understanding of the components of the downloaded zip file.
5. Understand how other systems and tools developed by the CDS Connect project (i.e., the Repository and CQL Services) can be used to share and implement the logic developed within the Authoring Tool.

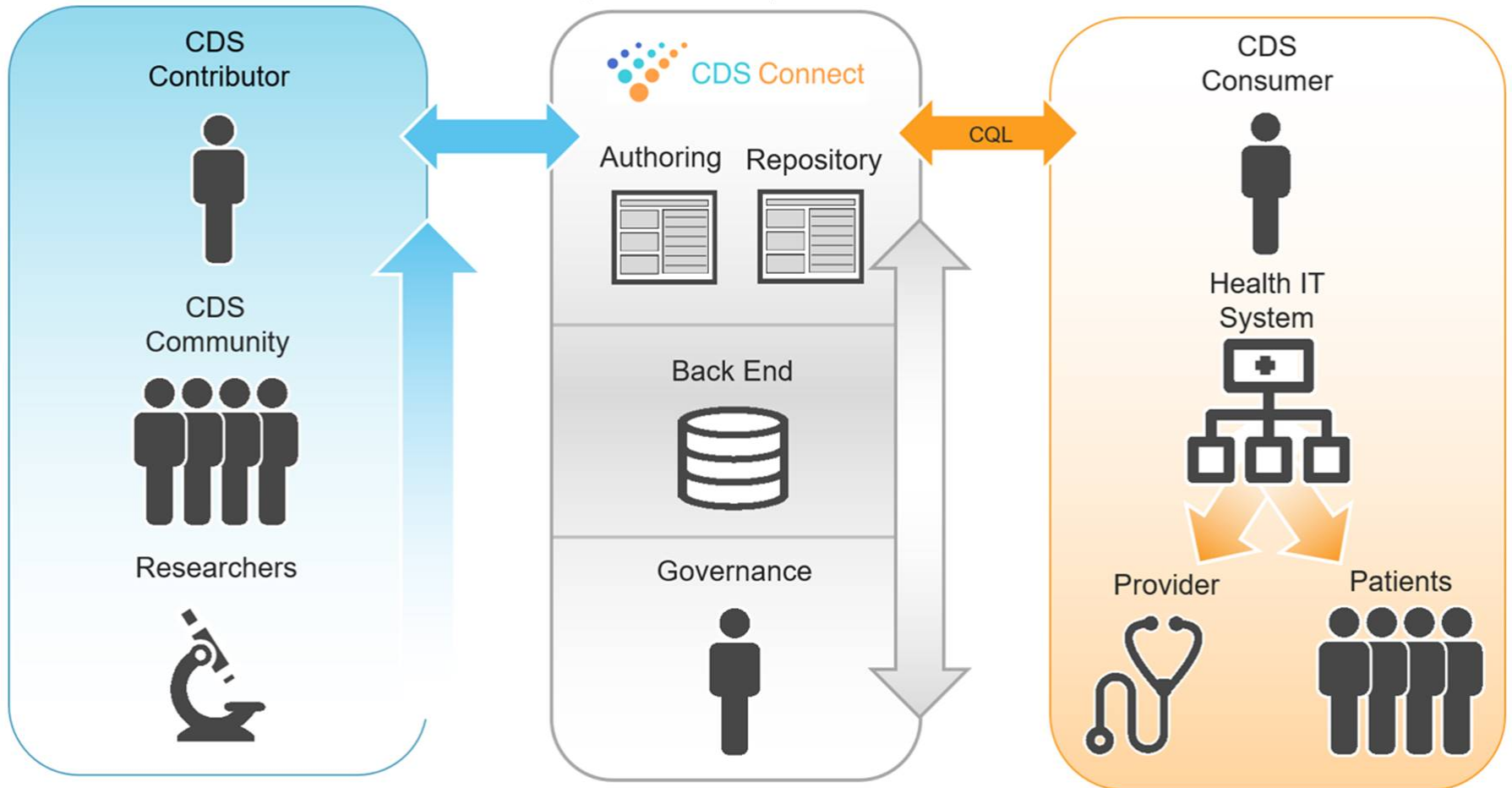


CDS Connect Project Overview and Knowledge Translation Resources

Sharon Sebastian, MITRE



CDS Connect Concept of Operations



CDS Connect Work Streams

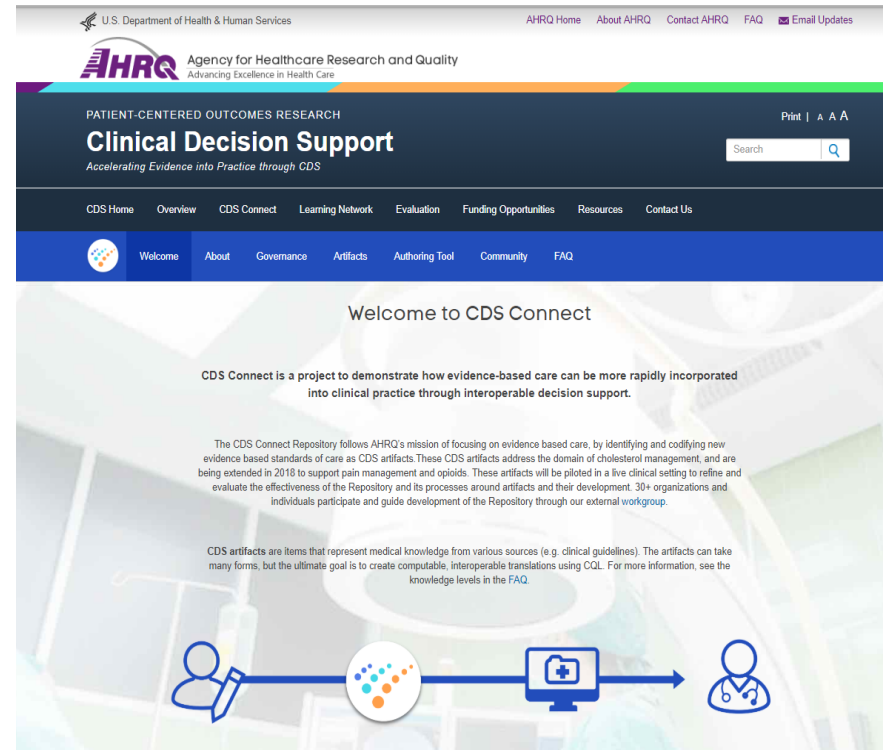
Repository: Design and build an online software “repository” for hosting and sharing new CDS artifacts

Authoring: Build a public-facing, web-based CDS Authoring Tool geared toward non-technical users

Artifacts: Identify and codify new CDS artifacts for care, in specific domains

Pilot: Pilot CDS artifacts in a live, clinical setting

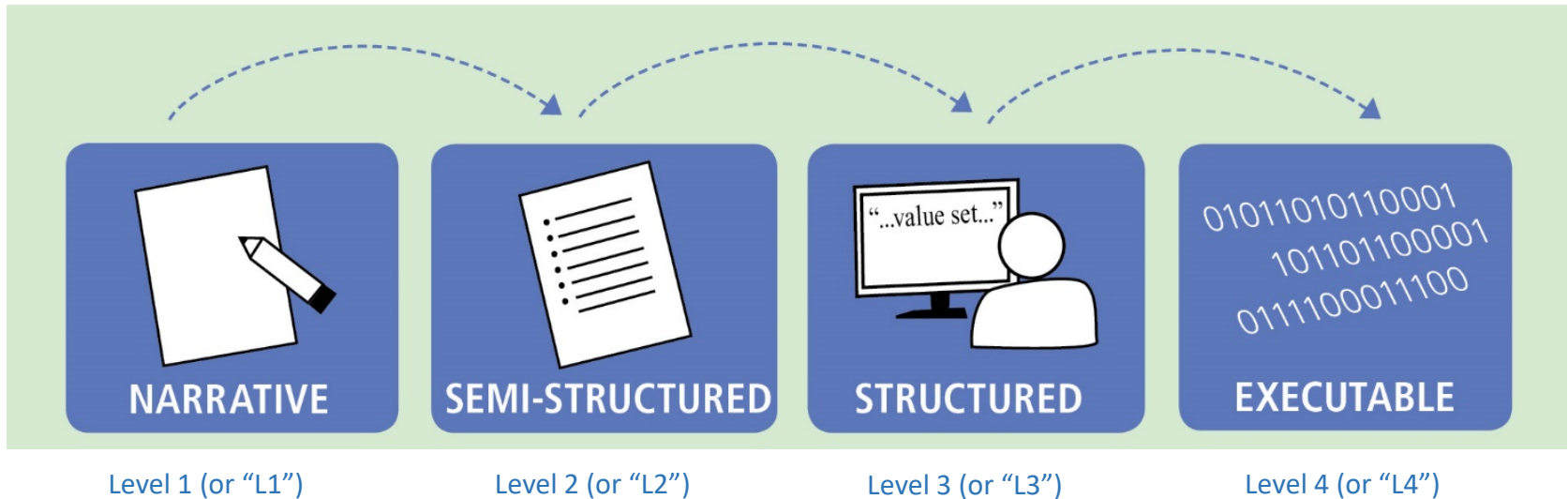
Work Groups: Convene external discussions focused on accelerating evidence into practice through CDS



<https://cds.ahrq.gov/cdsconnect>



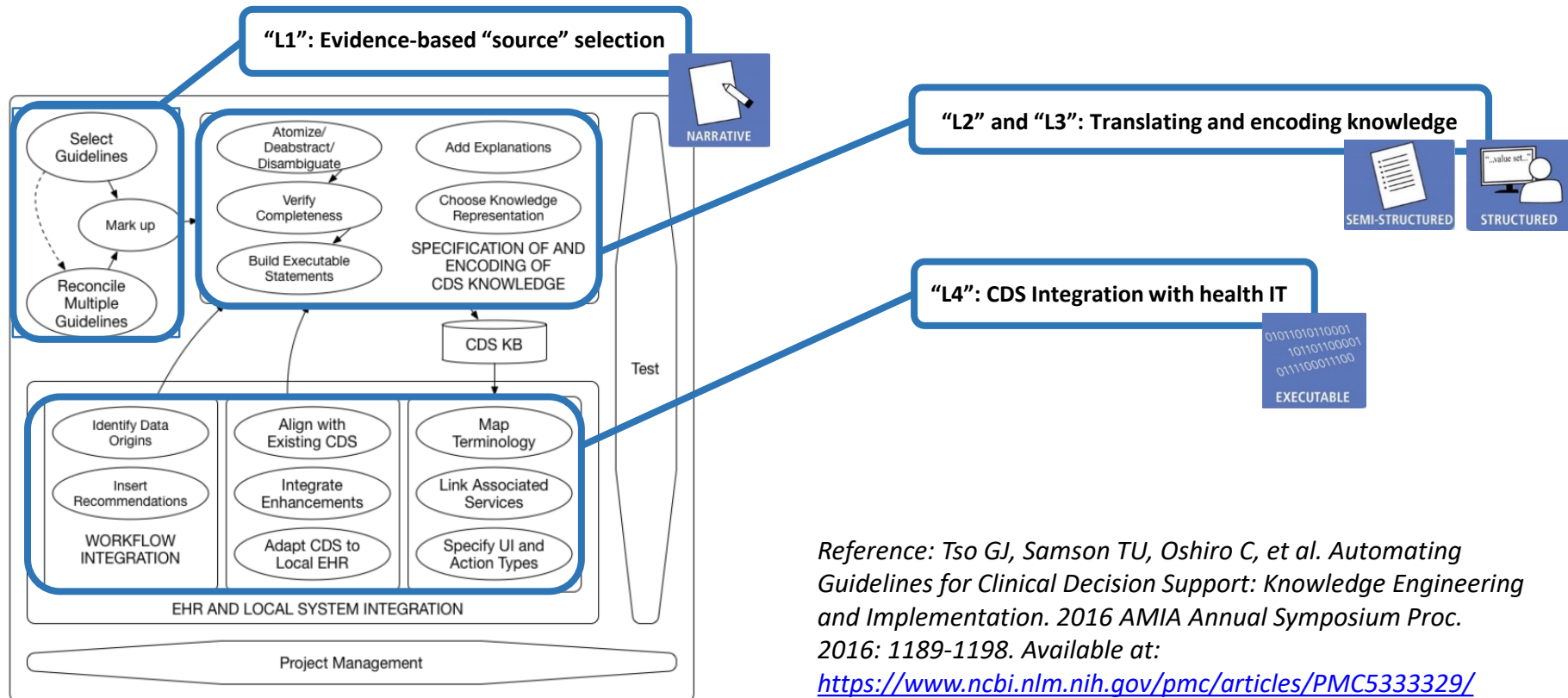
Knowledge Translation into CDS



Adapted from: Boxwala, A. A., et al. (2011). "A multi-layered framework for disseminating knowledge for computer-based decision support." *Journal of the American Medical Informatics Association* : JAMIA 18 Suppl 1: i132-139.



Knowledge Translation Methodology





CDS Authoring Tool Standards

Chris Moesel, MITRE



CDS Authoring Tool: Health IT Standards

HL7 Clinical Quality Language (CQL)

```
USPSTF_Statin_Use_for_Primary_Prevention_of_CVD_in_Adults_FHIRv102.cql — cds_artifact_collaboration
USPSTF_Statin_Use_for_Primary_Prevention_of_CVD_in_Adults_FHIRv102.cql
200 // Target population ##
201
202 // Determines if patient's age, in years, at the time CQL is run, is within the limits defined by the USPSTF
203 // recommendation (49 years - 75 years inclusive). **NOTE**: The CQL 'between' operator is inclusive.
204 define T1Demographic:
205   AgeInYears() between 49 and 75
206
207 // The most recent verified (final or amended) LDL test.
208 define MostRecentLDLTest:
209   C3F.MostRecent(C3F.Verified [Observation: "LDL Test"])
210
211 // The most recent verified (final or amended) LDL test that is no more than six years old.
212 // Evaluation of CVD risk is recommended every 4-6 years, along with the data requirements
213 // to calculate risk (i.e., lab values and smoking status). Results older than 6 years may
214 // not accurately reflect the patient's current condition.
215 define MostRecentValidLDLTest:
216   C3F.MostRecent(C3F.Verified C3F.ObservationLookback([Observation: "LDL Test"], 6 years))
217
218 // The most recent verified LDL result, converted to mg/dL (if necessary), and no older than 6 years.
219 define MostRecentValidLDLResult:
220   Convert.to_mg_per_dL(C3F.QuantityValue(MostRecentValidLDLTest))
221
222 // **TODO**: For some reason, using a union causes the execution engine to choke, so we need to use the where
223 // This should be investigated and fixed in the future.
224 define HDLTTests:
225   [Observation] 0
226   where 0.code in "HDL-C Laboratory Test" or 0.code in "High Density Lipoprotein (HDL)"
227
228 // The most recent verified (final or amended) HDL test
229 define MostRecentHDLTest:
230   C3F.MostRecent(C3F.Verified HDLTTests)
231
232 // The most recent verified (final or amended) HDL test that is no more than six years old.
233 // Evaluation of CVD risk is recommended every 4-6 years, along with the data requirements
234 // to calculate risk (i.e., lab values and smoking status). Results older than 6 years may
235 // not accurately reflect the patient's current condition.
236 define MostRecentValidHDLTest:
237   C3F.MostRecent(C3F.Verified C3F.ObservationLookback(HDLTests, 6 years))
238
239 // The most recent verified HDL result, converted to mg/dL (if necessary), and no older than 6 years.
240 define MostRecentValidHDLResult:
241   Convert.to_mg_per_dL(C3F.QuantityValue(MostRecentValidHDLTest))
242
243 // Determines if patient has a confirmed and active diagnosis of diabetes. Only confirmed and active diagnosis
244 // used based on the Cholesterol Workgroup feedback from the May 2017 meeting.
245 define HasDiabetes:
246   Exists(C3F.Confirmed C3F.ActiveCondition([Condition: "Diabetes"]))
```

HL7 Fast Healthcare Interoperability Resources (FHIR)

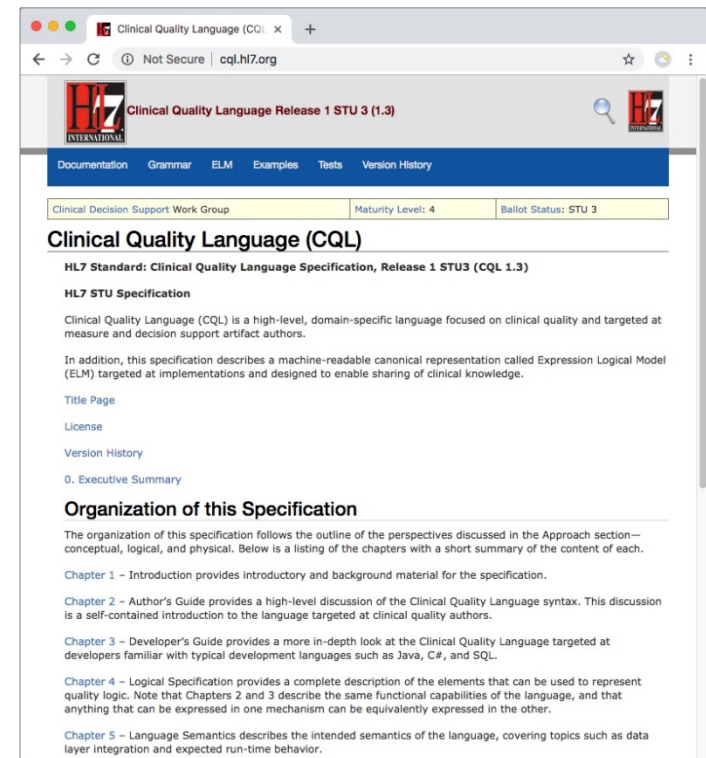
```
Brenda_Jackson.json — cds_artifact_collaboration
Brenda_Jackson.json
1 {}
2
3 "resourceType": "Bundle",
4 "id": "Brenda Jackson",
5 "type": "collection",
6 "entry": [
7   {
8     "resource": {
9       "resourceType": "Patient",
10      "id": "57134772-9904-4248-ac3e-c22684f42be6",
11      "name": [
12        {
13          "given": [
14            "Brenda"
15          ],
16          "family": [
17            "Jackson"
18          ]
19        }
20      ],
21      "gender": "female",
22      "birthDate": "1956-10-14"
23    },
24    "resource": {
25      "resourceType": "Condition",
26      "id": "1e45dcde-fb6d-4969-9864-c7d4d657af43",
27      "patient": {
28        "reference": "Patient/57134772-9904-4248-ac3e-c22684f42be6"
29      },
30      "code": {
31        "coding": [
32          {
33            "system": "http://snomed.info/sct",
34            "code": "283862005",
35            "display": "Fibromyalgia (disorder)"
36          }
37        ],
38        "text": "Fibromyalgia (disorder)"
39      },
40      "clinicalStatus": "active",
41      "verificationStatus": "confirmed",
42      "onsetDateTime": "2013-04-05T16:00:00.000Z",
43      "dateRecorded": "2013-04-05"
44    }
45  ],
46  "resource": {
47    "resourceType": "Bundle",
48    "id": "Brenda Jackson",
49    "type": "collection",
50    "entry": [
51      {
52        "resource": {
53          "resourceType": "Patient",
54          "id": "57134772-9904-4248-ac3e-c22684f42be6",
55          "name": [
56            {
57              "given": [
58                "Brenda"
59              ],
60              "family": [
61                "Jackson"
62              ]
63            }
64          ],
65          "gender": "female",
66          "birthDate": "1956-10-14"
67        },
68        "resource": {
69          "resourceType": "Condition",
70          "id": "1e45dcde-fb6d-4969-9864-c7d4d657af43",
71          "patient": {
72            "reference": "Patient/57134772-9904-4248-ac3e-c22684f42be6"
73          },
74          "code": {
75            "coding": [
76              {
77                "system": "http://snomed.info/sct",
78                "code": "283862005",
79                "display": "Fibromyalgia (disorder)"
80              }
81            ],
82            "text": "Fibromyalgia (disorder)"
83          },
84          "clinicalStatus": "active",
85          "verificationStatus": "confirmed",
86          "onsetDateTime": "2013-04-05T16:00:00.000Z",
87          "dateRecorded": "2013-04-05"
88        }
89      ]
90    }
91  }
92 }
```

HL7 = Health Level 7

HL7 Clinical Quality Language (CQL)

“Clinical Quality Language (CQL) is a high-level, domain-specific language focused on clinical quality and targeted at measure and decision support artifact authors.”

HL7 Standard: Clinical Quality Language Specification, Release 1 STU3 (CQL 1.3)
<http://cql.hl7.org/>



CQL Key Points

- The CQL specification defines two components:
 - **Clinical Quality Language:** Author-friendly domain-specific language
 - **Expression Logical Model:** Computable XML or JSON
- CQL leverages best practices and lessons learned from:
 - **Quality Data Model:** Focus on ease of authoring
 - **Health eDecisions:** Focus on modularity and computability
 - **eCQM & CDS Communities:** HL7 Work Groups, S&I Framework
- CQL is designed to work with any data model
- CQL is a HL7 Standard for Trial Use (STU)



CQL Example: Systolic Blood Pressure

```
valueset "Systolic Blood Pressure": '2.16.840.1.113883.3.526.3.1032'

define LastSystolicBPValue:
  Last (
    [Observation: "Systolic Blood Pressure"] O
    where O.status.value = 'final'
    and (
      O.valueQuantity.unit.value in {'mm[Hg]', 'mmHg', 'mm Hg'}
      or O.valueQuantity.code.value = 'mm[Hg]'
    )
    return FHIRHelpers.ToDecimal(O.valueQuantity.value)
    sort by O.effectiveDateTime
  )
```



CQL Example: MeetsInclusionCriteria

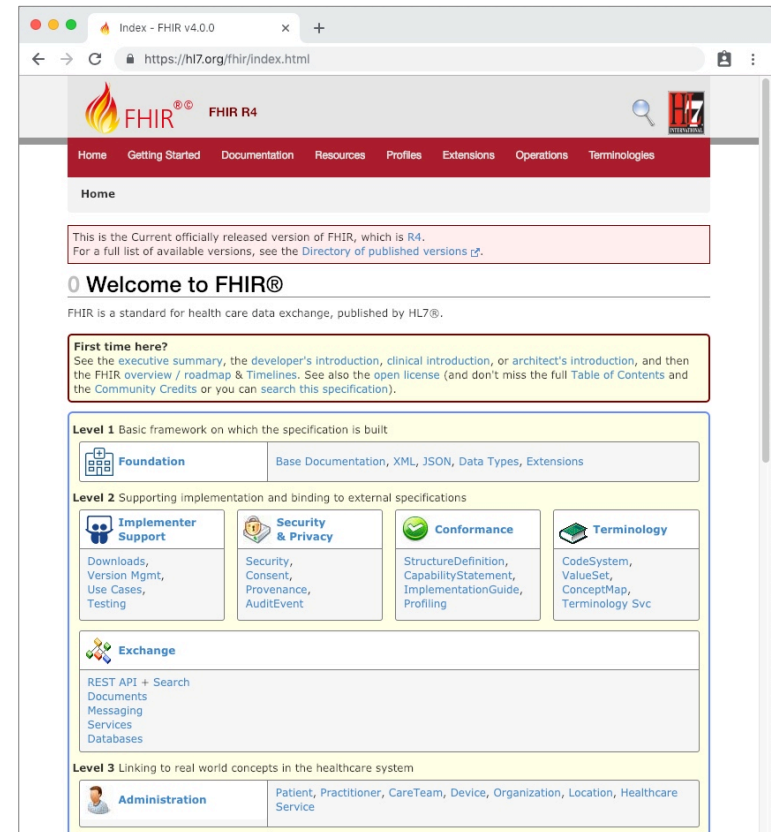
```
define InDemographic:  
  AgeInYears() between 40 and 75  
  
define HasCVDRiskFactors:  
  MostRecentValidLDLResult > 130 'mg/dL'  
  or MostRecentValidHDLResult < 40 'mg/dL'  
  or HasDiabetes  
  or HasHypertension  
  or IsSmoker  
  
define MeetsInclusionCriteria:  
  InDemographic  
  and HasCVDRiskFactors  
  and (  
    MostRecentValidCVDRiskAssessmentResult > 10.0 '%'  
    or (GradeCRecommendationEnabled and MostRecentValidCVDRiskAssessmentResult >= 7.5 '%')  
  )
```

HL7 Fast Healthcare Interoperability Resources (FHIR)

“FHIR is a standard for health care data exchange, published by HL7®.”

HL7 FHIR Release 4 (v4.0.0)

<http://hl7.org/fhir/R4/index.html>





FHIR Examples: Patient and Condition

```
{
  "resourceType": "Patient",
  "id": "e7c7c18c 06e1 4426 be5b 494f4573b457",
  "name": [
    {
      "given": [
        "Brenda"
      ],
      "family": [
        "Jackson"
      ]
    }
  ],
  "gender": "female",
  "birthDate": "1956 10 14"
}
```

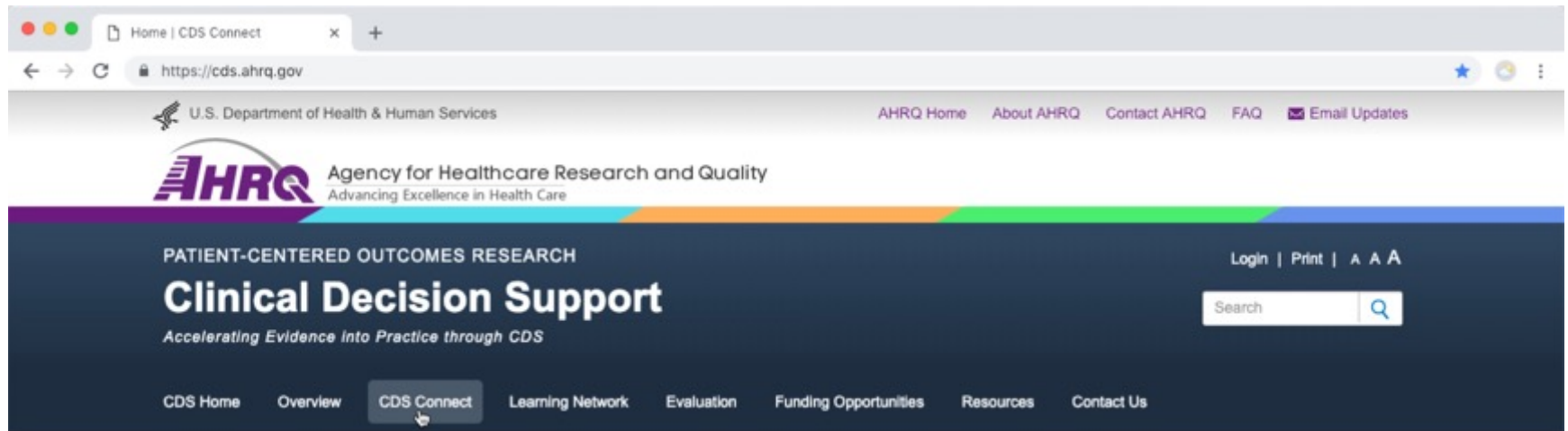
```
{
  "resourceType": "Condition",
  "id": "7d0735e7 f062 45af 843c a3e3e7f48888",
  "patient": {
    "reference": "Patient/e7c7c18c 06e1 4426 be5b 494f4573b457"
  },
  "code": {
    "coding": [
      {
        "system": "http://snomed.info/sct",
        "code": "203082005",
        "display": "Fibromyalgia (disorder)"
      }
    ]
  },
  "text": "Fibromyalgia (disorder)"
},
"clinicalStatus": "active",
"verificationStatus": "confirmed",
"onsetDateTime": "2013 04 05T16:00:00.000Z",
"dateRecorded": "2013 04 05"
}
```



CDS Connect Repository



CDS Connect Repository



In 2016, AHRQ launched a program of grants and contracts aimed at helping health care providers move patient-centered outcomes research (PCOR) evidence into practice through clinical decision support (CDS). AHRQ advances the science of CDS by supporting implementers, clinicians, and technology vendors in developing CDS tools that are shareable, standards-based, publicly-available, and patient-centered. The four components are detailed below.



Learning Network

AHRQ awarded RTI International a cooperative agreement to become the Patient-Centered Clinical Decision Support Learning Network (PCCDS-LN). The PCCDS-LN is building a community of researchers, clinicians, professional societies, and others that is exploring and advancing patient-centered CDS.



CDS Connect

AHRQ awarded the MITRE Corporation a contract to develop "CDS Connect", an online web presence that will function as a repository of CDS artifacts and create prototype infrastructure for sharing CDS across different health care settings and technologies. MITRE will also develop, pilot, and share CDS artifacts on CDS Connect as a proof-of-concept.



CDS Connect Repository

U.S. Department of Health & Human Services

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AHRQ Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

PATIENT-CENTERED OUTCOMES RESEARCH

Clinical Decision Support

Accelerating Evidence Into Practice through CDS

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Welcome About Governance **Artifacts** Authoring Tool Community FAQ

Welcome to CDS Connect

CDS Connect is a project to demonstrate how evidence-based care can be more rapidly incorporated into clinical practice through interoperable decision support.

The CDS Connect Repository follows AHRQ's mission of focusing on evidence based care, by identifying and codifying new evidence based standards of care as CDS artifacts. These CDS artifacts address the domain of cholesterol management, and are being extended in 2018 to support pain management and opioids. These artifacts will be piloted in a live clinical setting to refine and evaluate the effectiveness of the Repository and its processes around artifacts and their development. 30+ organizations and individuals participate and guide development of the Repository through our external [workgroup](#).

CDS artifacts are items that represent medical knowledge from various sources (e.g. clinical guidelines). The artifacts can take many forms. The primary goal is to create computable, interoperable translations using CQL. For more information, see the [FAQ](#).

<https://cds.ahrq.gov/cdsconnect/artifact>



CDS Connect Repository

[Welcome](#)[About](#)[Governance](#)[Artifacts](#)[Authoring Tool](#)[Community](#)[FAQ](#)[Welcome](#) / [Explore CDS Connect Artifacts](#)

Explore CDS Connect Artifacts

CDS Connect demonstrates a web-based Repository for clinical decision support resources, known as artifacts.

[Learn about artifacts](#)**New**

Interventions for Unhealthy Alcohol Use: SmartSet for Note Documentation, Referrals, and Medications

☒ Smart Documentation Form

Publisher: RTI-UNC Evidence-based Practice Center

2018

☒ Internal Medicine, Family Medicine, Preventive Medicine

Screening and Interventions for Unhealthy Alcohol Use: Logic for Best Practice Alerts

Alert

Publisher: RTI-UNC Evidence-based Practice Center

2018

☒ Internal Medicine, Family Medicine, Preventive Medicine

Neurology: Traumatic Brain Injury (TBI) Screening Documentation Template

☒ Smart Documentation Form

Publisher: Veterans Health Administration

Neurology: Traumatic Brain Injury (TBI) Documentation Template

☒ Smart Documentation Form

Publisher: Veterans Health Administration

**Anaphylaxis: Artifacts** [\(View Topic\)](#)

Primary Care: Anaphylaxis Treatment Protocol Order Set



CDS Connect Repository

Cardiovascular Disease Prevention: *Artifacts* (View Topic)

Aspirin Therapy for Primary Prevention of CVD and Colorectal Cancer

≡ Event-Condition-Action (ECA) rule

Publisher: The MITRE Corporation

2017

✓ Preventive Medicine, Internal Medicine, Family Medicine, Cardiology

CMS's Million Hearts® Model Longitudinal ASCVD Risk Assessment Tool for Shared Decision Making

≡ Event-Condition-Action (ECA) rule

Publisher: The MITRE Corporation

2017

✓ Preventive Medicine, Internal Medicine, Cardiology, Family Medicine

CMS's Million Hearts® Model Longitudinal ASCVD Risk Assessment Tool for Updated 10-Year ASCVD Risk

≡ Event-Condition-Action (ECA) rule

Publisher: The MITRE Corporation

2017

✓ Internal Medicine, Preventive Medicine, Cardiology, Family Medicine

CMS's Million Hearts® Model Longitudinal ASCVD Risk Assessment Tool for Baseline 10-Year ASCVD Risk

✓ Risk Assessment

Publisher: The MITRE Corporation

2018

✓ Preventive Medicine, Internal Medicine, Cardiology, Family Medicine

Statin Therapy for the Prevention and Treatment of Cardiovascular Disease (CVD) eCQM

≡ Event-Condition-Action (ECA) rule

Publisher: The MITRE Corporation

2017

✓ Preventive Medicine, Internal Medicine, Family Medicine, Cardiology

Statin Use for the Primary Prevention of CVD in Adults

≡ Event-Condition-Action (ECA) rule

Publisher: The MITRE Corporation

2017

✓ Preventive Medicine, Internal Medicine, Family Medicine, Cardiology

Childhood Obesity: *Artifacts* (View Topic)

Healthy Weight Care Assistant

📎 Multimodal

<https://cds.ahrq.gov/cdsconnect/artifact/statin-use-primary-prevention-cvd-adults>



CDS Connect Repository

Statin Use for the Primary Prevention of CVD in Adults

Presents a United States Preventive Services Task Force (USPSTF) statin therapy recommendation for adults aged 40 to 75 years without a history of cardiovascular disease (CVD) who have 1 or more CVD risk factors (i.e., dyslipidemia, diabetes, hypertension, or smoking) and a calculated 10-year CVD event risk score of 7.5% or greater.

Artifact Type

Event-Condition-Action (ECA) rule

Creation Date

Mon, 07/10/2017 - 12:00

Version

0.1.1

Status

Active

Identifier

CDS 009

Experimental

False

PROMINENT REPORTS

[Detailed report on the pilot implementation of this artifact \(DOC 2.7Mb\)](#)

[Artifact enhancements based on pilot implementation findings \(DOC 91Kb\)](#)

ARTIFACT CREATION AND USAGE

Steward

[Agency for Healthcare Research and Quality](#)

License

[AHRQ Government Unlimited Usage Rights](#)

IP Attestation

Yes (Report Infringement)

Copyrights

Recommendation is copyrighted by USPSTF and administered by AHRQ.

If you would like further information, would like to give us feedback, or have any questions about this artifact, please contact us at ClinicalDecisionSupport@ahrq.hhs.gov

Clinical Domain

☒ Preventive Medicine ☒ Internal Medicine ☒ Family Medicine ☒ Cardiology

Publisher

[The MITRE Corporation](#)



CDS Connect Repository

Inclusions

Patient is ≥ 40 and ≤ 75 years of age

AND 1 or more risk factor:

LDL-C lab result > 130 mg/dL (MOST RECENT value within the past 6 years)

OR HDL-C < 40 mg/dL (MOST RECENT value within the past 6 years)

OR Diabetes (Type 1 or Type 2)

OR Hypertension

OR Smoking (MOST RECENT value within the past 6 years)

AND 10-Year CVD risk score $\geq 7.5\%$ (MOST RECENT value within the past 6 years)

Exclusions

Diagnosis of CVD

OR LDL-C lab result > 190 mg/dL (MOST RECENT value within the past 6 years)

OR Known Familial Hypercholesterolemia

OR Diagnosis of Active Pregnancy OR Pregnancy Observation in the past 42 weeks

OR Diagnosis: Breastfeeding OR Breastfeeding Observation in the past year

OR Diagnosis of End Stage Renal Disease

OR Actively undergoing dialysis (i.e., within past 7 days)

OR Diagnosis of Active Cirrhosis

OR Already receiving a statin (Medication is Active or has been Ordered)

Interventions and Actions

Intervention **DISPLAY** notification to provider:



CDS Connect Repository

Intervention **DISPLAY** notification to provider:

1) If CVD risk score $\geq 7.5\%$ and $< 10\%$ (Grade C):

Recommendation: **Discuss** initiation of low to moderate intensity lipid lowering therapy

Rationale: The USPSTF found adequate evidence that use of low- to moderate-dose statins reduces the probability of CVD events and mortality by at least a small amount in adults aged 40 to 75 years who have 1 or more CVD risk factors (dyslipidemia, diabetes, hypertension, or smoking) and a calculated 10-year CVD event risk of 7.5% to 10%.

2) If CVD risk score $\geq 10\%$ (Grade B):

Recommendation: **Start** low to moderate intensity lipid lowering therapy based on outcome of shared decision making between patient and provider

Rationale: The USPSTF found adequate evidence that use of low- to moderate-dose statins reduces the probability of CVD events (MI or ischemic stroke) and mortality by at least a moderate amount in adults aged 40 to 75 years who have 1 or more CVD risk factors (dyslipidemia, diabetes, hypertension, or smoking) and a calculated 10-year CVD event risk of 10% or greater.

3) If Does Not Meet Inclusion Criteria:

Recommendation: No USPSTF recommendation provided, as patient does not meet inclusion criteria

Rationale: The USPSTF guideline applies to adults aged 40 to 75 years who have 1 or more CVD risk factors (dyslipidemia, as evidenced by LDL > 130 mg/dL or HDL < 40 mg/dL, diabetes, hypertension, or smoking) and a calculated 10-year CVD event risk $\geq 7.5\%$ (grade C) or $\geq 10\%$ (grade B)

4) Is Excluded:

Recommendation: No USPSTF recommendation provided, as patient meets exclusion criteria

Rationale: This USPSTF guideline should not be used for patients with any of the following: LDL > 190 mg/dL, a previous CVD diagnosis or procedure, familial hypercholesterolemia, end stage renal disease, cirrhosis, recent dialysis, or patients who are pregnant, breastfeeding, or currently on a statin.

5) Error Message When Missing Data But CDS Can Still Be Processed Enough To Get An Answer

WARNING: Adequate data to process CDS, but one of the following items is missing or more than 6 years old: LDL, HDL, smoking status, or CVD risk score.

6) Error Message When Missing Data Prevents CDS From Being Processed

ERROR: Inadequate data to process CDS, as one of the following items is missing or more than 6 years old: LDL, HDL, smoking status, or CVD risk score.



CDS Connect Repository

Action **REQUEST** medication order

Action **DOCUMENT** any new medications on the active medication list

Action **DOCUMENT** provider response if a reason for not prescribing a statin is provided


Intervention **DISPLAY** link to relevant recommendation statement available at:
<https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/statin-use-in-adults-preventive-medication1?ds=1&s=statin#>

Intervention **DISPLAY** link to reference information: <http://jamanetwork.com/journals/jama/fullarticle/2584058>

Intervention **DISPLAY** link to statin shared decision making tool (e.g. Mayo Clinic Shared Decision Making National Resource Center at:
<http://shareddecisions.mayoclinic.org/discussion/the-new-statin-choice-decision-aid/#>)

Intervention **DISPLAY** link to education materials that are relevant to the patient's plan of care

Logic Files

 USPSTF Statin Use for Primary Prevention of CVD in Adults FHIRv102_v1.0.1_CQL.zip	24.74 KB
 USPSTF Statin Use for Primary Prevention of CVD in Adults FHIRv102_v1.0.1_CR.zip	62.28 KB

TESTING EXPERIENCE

Pilot Experience

This artifact underwent integration testing and an 8-week pilot implementation at a Federally Qualified Health Center (FQHC) affiliated with AllianceChicago in July-August 2017. The artifact performed reliably and consistently produced appropriate notifications and interventions to clinical providers.

Please see attached documents in the Implementation Detail section of the repository to view the Pilot Report and the list of enhancements made to the artifact based on the pilot implementation.



CDS Authoring Tool



CDS Authoring Tool

The screenshot shows a web browser window with the address bar displaying "https://cds.ahrq.gov/authoring/". The page header includes the U.S. Department of Health & Human Services logo and navigation links: "AHRQ Home", "About AHRQ", "Contact AHRQ", "FAQ", and "Email Updates". Below the header is the AHRQ logo and the text "Agency for Healthcare Research and Quality Advancing Excellence in Health Care". The main navigation bar features "PATIENT-CENTERED OUTCOMES RESEARCH" and "Clinical Decision Support Authoring". A "Login" button is visible in the top right. The main content area has a dark blue background with the text "Create shareable standards-based CDS artifacts" and "The Clinical Decision Support (CDS) Authoring Tool is a component of the CDS Connect project." A prominent "SIGN UP" button is centered in the main content area. The background of the main content area shows a desk with a laptop, a smartphone, a keyboard, and a pen.



Transform



Create



Share



Contribute



CDS Authoring Tool

CDS Authoring Tool Sign-Up

Full Name*

Email

Email*

Email (confirm)*

Do you require Section 508 of the Rehabilitation Act (29 U.S.C. 794d) accessibility program compliance assistance?*

Yes


No

This warning banner provides privacy and security notices consistent with applicable federal laws, directives, and other federal guidance for accessing this Government system, which includes all devices/storage media attached to this system. This system is provided for Government-authorized use only. Unauthorized or improper use of this system is prohibited and may result in disciplinary action and/or civil and criminal penalties. At any time, and for any lawful Government purpose, the government may monitor, record, and audit your system usage and/or intercept, search and seize any communication or data transiting or stored on this system. Therefore, you have no reasonable expectation of privacy. Any communication or data transiting or stored on this system may be disclosed or used for any lawful Government purpose.

Submit

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 Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

PATIENT-CENTERED OUTCOMES RESEARCH

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Clinical Decision Support Authoring

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Create shareable standards-based CDS artifacts

The Clinical Decision Support (CDS) Authoring Tool is a component of the CDS Connect project.

[SIGN UP](#)



Transform



Create



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The Clinical Decision Support (CDS) Authoring Tool is a component of the CDS Connect project.

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Artifact Name

Version

[New Artifact](#)

ARTIFACT NAME	VERSION	LAST UPDATED	
Diabetic Foot Exam	1.0.0	5 months ago	Edit Info Delete

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Artifact Name Version [New Artifact](#)

ARTIFACT NAME	VERSION	LAST UPDATED	
Statin Use Demo	1.0.0	a few seconds ago	✎ Edit Info ✕ Delete
Diabetic Foot Exam	1.0.0	5 months ago	✎ Edit Info ✕ Delete

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Statin Use Demo

Download CQL ▾ Save

Inclusions Exclusions Subpopulations Base Elements Recommendations Parameters Handle Errors

+ Add element

Choose element type ▾



CDS Authoring Tool: Inclusions

Statin Use Demo

Download CQL

Save

Inclusions

Exclusions

Subpopulations

Base Elements

Recommendations

Parameters

Handle Errors

+ Add element

Choose element type

Allergy Intolerance

Base Elements

Condition

Demographics

Encounter

Medication Statement

Medication Order

Observation

Parameters

Procedure

VSAC authentication required

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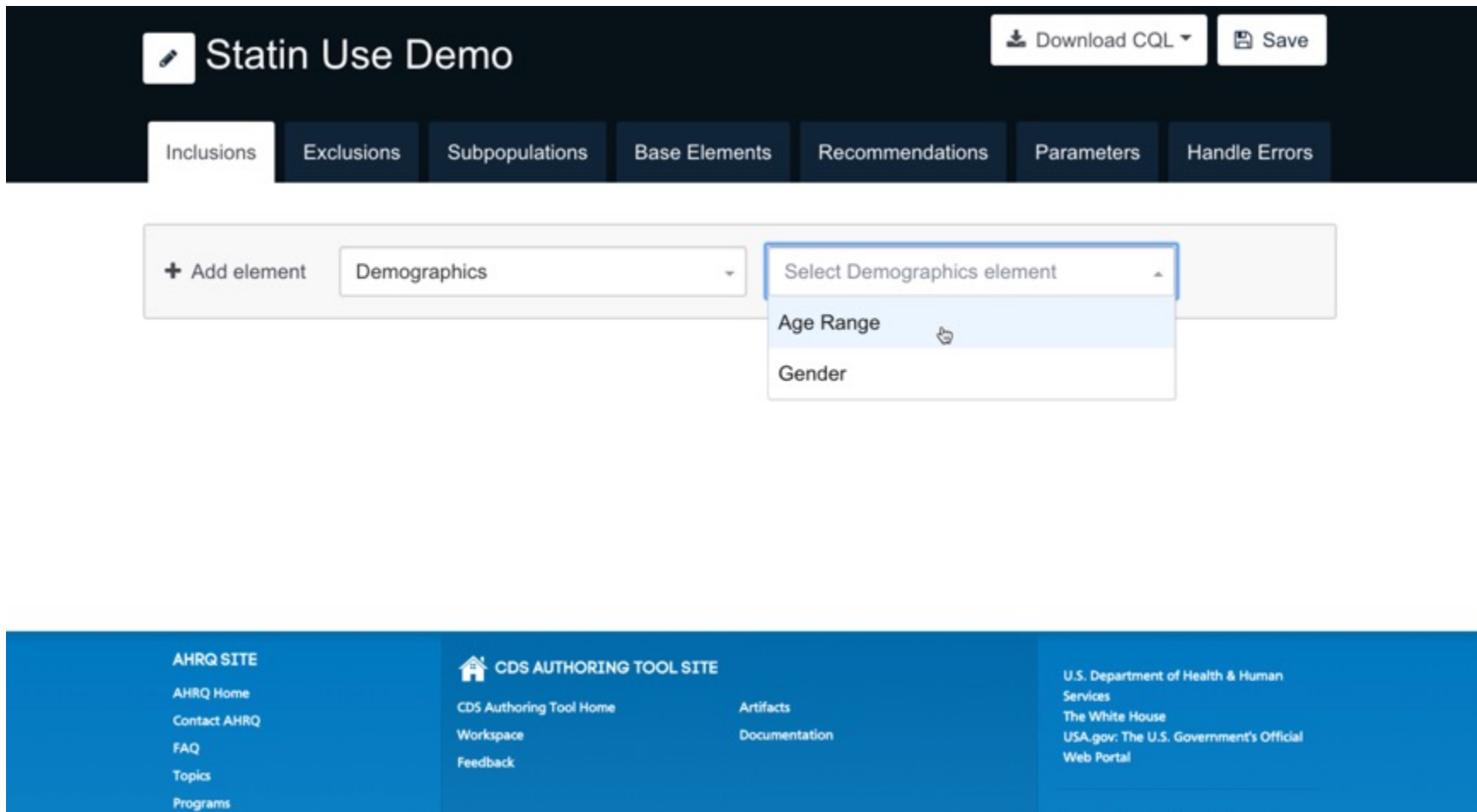
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CDS Authoring Tool: Inclusions



The screenshot displays the CDS Authoring Tool interface. At the top, the title "Statin Use Demo" is shown next to a pencil icon. To the right are buttons for "Download CQL" and "Save". Below the title is a navigation bar with tabs: "Inclusions", "Exclusions", "Subpopulations", "Base Elements", "Recommendations", "Parameters", and "Handle Errors". The "Inclusions" tab is active. Below the tabs, there is a section for adding elements. It includes a "+ Add element" button, a dropdown menu currently showing "Demographics", and a list of options: "Age Range" and "Gender". A mouse cursor is pointing at "Age Range".

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CDS Authoring Tool: Inclusions

Age Range: ⌵ ⌵ ✕

The patient's **age** is between 40 years and 75 years

Minimum Age:

Maximum Age:

Unit of Time: ✕ ⌵

Return Type: ☒ Boolean

Add Expression

⌵

+ Add element ⌵



CDS Authoring Tool: Inclusions

Add Expression

And

+ Add element

Choose element type

Allergy Intolerance

Base Elements

Condition

Demographics

Encounter

Medication Statement

Medication Order

Observation

Parameters

Procedure

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CDS Authoring Tool: Inclusions

Add Expression

And

+ Add element

Observation

Authenticate VSAC

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CDS Authoring Tool: Inclusions

Login to VSAC your account

Use your UMLS account to log in to VSAC to access value sets and codes within the CDS Authoring Tool.

Cancel

Login

CDS Authoring Tool: Inclusions

Add Expression

And

+ Add element
Observation

✓ VSAC Authenticated
Add Value Set
Add Code

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---	---	--	---



CDS Authoring Tool: Inclusions

Choose Value Sets

LDL

Search

Close

CDS Authoring Tool: Inclusions

Choose Value Sets
10

NAME/OID	STEWARD	CODES
LDL Code 2.16.840.1.113883.3.600.872	QIP	9
LDL Code LOINC 2.16.840.1.113883.3.600.869	QIP	9
LDL Test 2.16.840.1.113883.3.464.1003.198.12.1016	NCQA PHEMUR	9
LDL Test 2.16.840.1.113883.3.464.1003.198.11.1029	NCQA PHEMUR	9



CDS Authoring Tool: Inclusions

Choose Value Sets

← LDL Test (2.16.840.1.113883.3.464.1003.198.11.1029)

Select

CODE	NAME	CODE SYSTEM
12773-8	Cholesterol in LDL [Units/volume] in Serum or Plasma by Electrophoresis	LOINC
13457-7	Cholesterol in LDL [Mass/volume] in Serum or Plasma by calculation	LOINC
18261-8	Cholesterol in LDL [Mass/volume] in Serum or Plasma ultracentrifugate	LOINC
18262-6	Cholesterol in LDL [Mass/volume] in Serum or Plasma by Direct assay	LOINC
2089-1	Cholesterol in LDL [Mass/volume] in Serum or Plasma	LOINC
22748-8	Cholesterol in LDL [Moles/volume] in Serum or Plasma	LOINC

Close



CDS Authoring Tool: Inclusions

Observation:

Element must have return type 'boolean'. Add expression(s) to change the return type.

Observations with a code from **LDL Test**

Value Set: LDL Test (2.16.840.1.113883.3.464.1003.198.11.1029)

Return Type: List Of Observations

Add Expression

✓ VSAC Authenticated

Add Value Set

Add Code

And

+ Add element

Choose element type



CDS Authoring Tool: Inclusions

Observation:

Element must have return type 'boolean'. Add expression(s) to change the return type.

Observations with a code from **LDL Test**

Value Set: LDL Test (2.16.840.1.113883.3.464.1003.198.11.1029)

Return Type: List Of Observations

Add Expression

Verified

With Unit

Highest Observation Value

Most Recent

Look Back

Exists

Is (Not) Null?

✓ VSAC Authenticated

Add Value Set

Add Code

And

+ Add element

Choose element type






CDS Authoring Tool: Inclusions

Observation:

Element must have return type 'boolean'. Add expression(s) to change the return type.

Verified observations with a code from **LDL Test**

Value Set: LDL Test (2.16.840.1.113883.3.464.1003.198.11.1029)  

Expressions: Verified 

Return Type: List Of Observations

Add Expression

Verified

With Unit

Highest Observation Value


Most Recent


Look Back

Exists


Is (Not) Null?

✓ VSAC Authenticated

 Add Value Set

 Add Code

And







CDS Authoring Tool: Inclusions


Observation:

Element must have return type 'boolean'. Add expression(s) to change the return type.


A **most recent** **verified** **observation** with a code from **LDL Test**

Value Set: LDL Test (2.16.840.1.113883.3.464.1003.198.11.1029)  

Expressions: Verified

Most Recent 

Return Type: Observation

 VSAC Authenticated

50



CDS Authoring Tool: Inclusions

Observation:

Element must have return type 'boolean'. Add expression(s) to change the return type.

A **most recent** **verified** **observation** with a code from **LDL Test**

Value Set: LDL Test (2.16.840.1.113883.3.464.1003.198.11.1029)

Expressions: Verified

Most Recent

Quantity Value

Return Type: System Quantity

Add Expression

Value Comparison

Convert Units

Is (Not) Null?

✓ VSAC Authenticated



Add Value Set

Add Code



CDS Authoring Tool: Inclusions



There exists a **most recent** **verified** **observation** with a code from **LDL Test** whose value is **greater than 130 mg/dL**

Value Set: LDL Test (2.16.840.1.113883.3.464.1003.198.11.1029)  

Expressions: Verified

Most Recent

Quantity Value

> **x** **130** **maxOp** **maxValue** **mg/dL**  

Return Type: ☒ Boolean

CODE	NAME
mg/dL	milligram per deciliter

1 of 1 total; 56 bytes in 11 ms

Add Expression

☒ VSAC Authenticated **Add Value Set** **Add Code**

And



CDS Authoring Tool: Base Elements

Statin Use Demo

Download CQL

Save

Inclusions

Exclusions

Subpopulations

Base Elements

Recommendations

Parameters

Handle Errors

Age 40 - 75:

»

×

The patient's age is between 40 years and 75 years

And

LDL > 130:

»

×

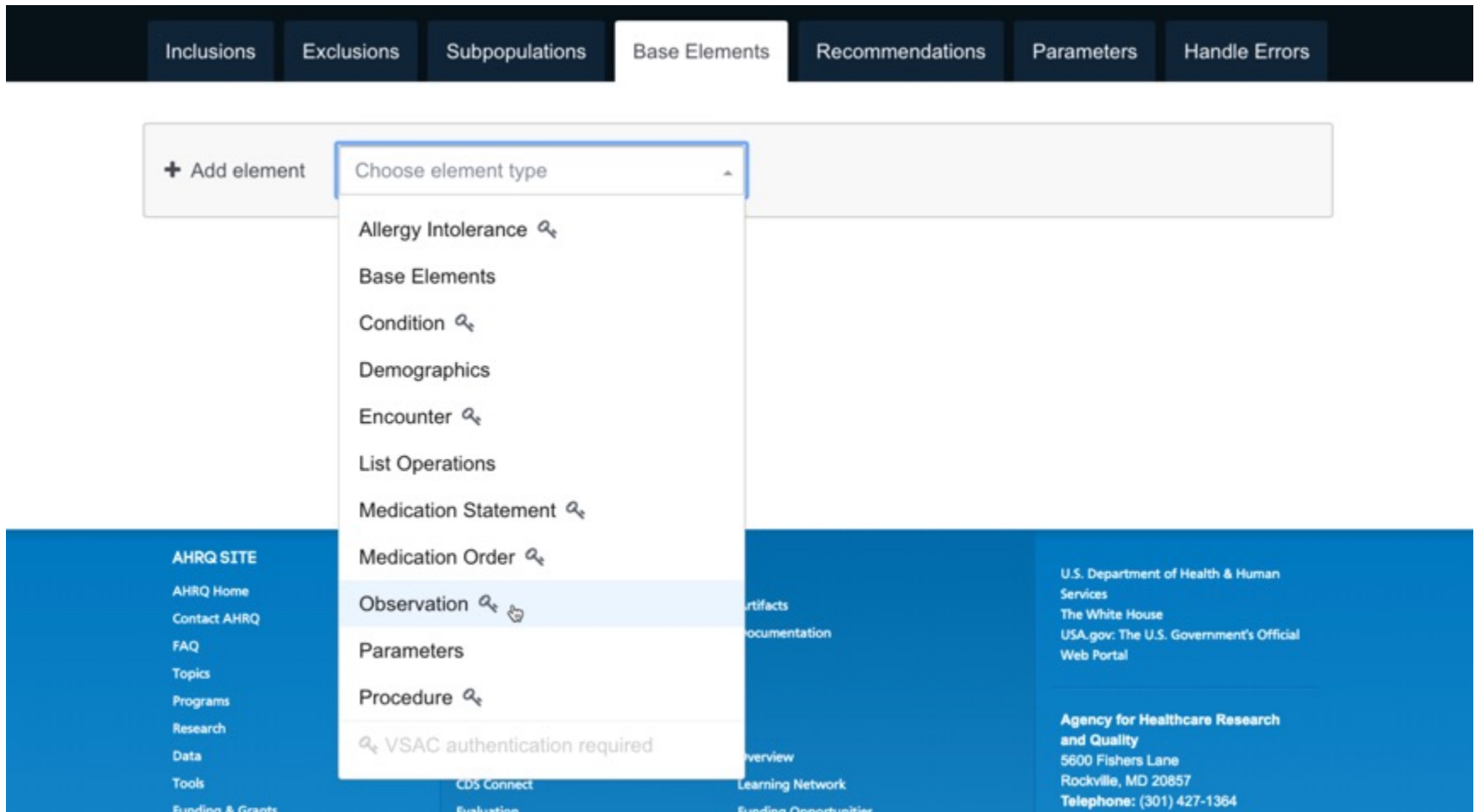
There exists a most recent verified observation with a code from LDL Test whose value is greater than 130 mg/dL

And

+ Add element

Choose element type

CDS Authoring Tool: Base Elements

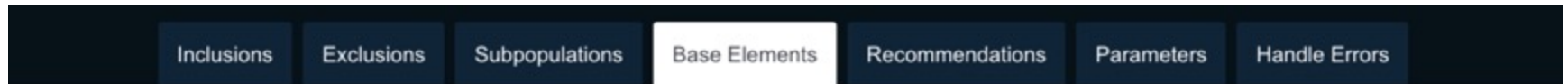


The screenshot displays the CDS Authoring Tool interface. At the top, a dark blue navigation bar contains several tabs: Inclusions, Exclusions, Subpopulations, Base Elements (which is the active tab), Recommendations, Parameters, and Handle Errors. Below this bar, a light gray box contains a '+ Add element' button and a 'Choose element type' dropdown menu. The dropdown menu is open, showing a list of element types: Allergy Intolerance, Base Elements, Condition, Demographics, Encounter, List Operations, Medication Statement, Medication Order, Observation (which is highlighted with a blue background and a mouse cursor), Parameters, and Procedure. At the bottom of the dropdown menu, there is a note: 'VSAC authentication required'. The bottom of the screen features a blue footer with a sidebar on the left containing links to AHRQ SITE, AHRQ Home, Contact AHRQ, FAQ, Topics, Programs, Research, Data, Tools, and Funding & Grants. The main footer area contains links to Artifacts, Documentation, Overview, Learning Network, and Funding Opportunities. On the right side of the footer, there is contact information for the U.S. Department of Health & Human Services, The White House, USA.gov, and the Agency for Healthcare Research and Quality, including its address and telephone number.

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CDS Authoring Tool: Base Elements



+ Add element

Observation

✓ VSAC Authenticated
Add Value Set
Add Code

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CDS Authoring Tool: Base Elements

Choose Code ✕

CDS Authoring Tool: Base Elements

Choose Code ✕

79423-0

LOINC

Validate

79423-0	LOINC	Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013
---------	-------	---

✓ Validation Successful!

Cancel

Select

CDS Authoring Tool: Base Elements

Inclusions

Exclusions

Subpopulations

Base Elements

Recommendations

Parameters

Handle Errors

Observation: 10-yr CVD Risk

Observations with a code from Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013

Code: LOINC (79423-0) - Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013

Return Type: ☒ List Of Observations

Add Expression

☒ VSAC Authenticated

Add Value Set

Add Code

+ Add element

Choose element type

CDS Authoring Tool: Base Elements

Inclusions

Exclusions

Subpopulations

Base Elements

Recommendations

Parameters

Handle Errors

Observation: 10-yr CVD Risk

Observations with a code from Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013

Code: LOINC (79423-0) - Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013

Return Type: ☒ List Of Observations

Add Expression

Verified

With Unit

Highest Observation Value

Most Recent

Look Back

Exists

Is (Not) Null?

☒ VSAC Authenticated

Add Value Set

Add Code

+ Add element

Choose element type

CDS Authoring Tool: Base Elements

Inclusions

Exclusions

Subpopulations

Base Elements

Recommendations

Parameters

Handle Errors

Observation: 10-yr CVD Risk

Verified observations with a code from

Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013

Code:

LOINC (79423-0) - Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013

Expressions:

Verified

Return Type:

✓ List Of Observations

Add Expression

Verified

With Unit

Highest Observation Value

Most Recent

Look Back

Exists

Is (Not) Null?

✓ VSAC Authenticated

Add Value Set

Add Code

60



CDS Authoring Tool: Base Elements

Inclusions

Exclusions

Subpopulations

Base Elements

Recommendations

Parameters

Handle Errors

Observation: 10-yr CVD Risk

A

most recent

verified

 observation with a code from

Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013

Code:

LOINC (79423-0) - Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013

Expressions:

Verified

Most Recent

Return Type:

✓ Observation

Add Expression

Quantity Value

Concept Value

Is (Not) Null?

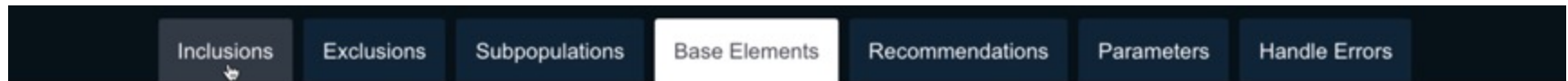
✓ VSAC Authenticated

Add Value Set

Add Code



CDS Authoring Tool: Inclusions



Observation: ⌵ ✕

A **most recent** **verified** observation with a code from

Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013

Code: LOINC (79423-0) - Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013 ✕

Expressions: Verified

Most Recent

Quantity Value ✕

Return Type: ☒ System Quantity

Add Expression



CDS Authoring Tool: Inclusions

Inclusions

Exclusions

Subpopulations

Base Elements

Recommendations

Parameters

Handle Errors

Age 40 - 75:

»

✕

The patient's age is between 40 years and 75 years

And

LDL > 130:

»

✕

There exists a most recent verified observation with a code from LDL Test whose value is greater than 130 mg/dL

And

+ Add element

Choose element type



CDS Authoring Tool: Inclusions

And ▾

+ Add element

Choose element type ▾

- Allergy Intolerance ⓘ
- Base Elements** ⓘ
- Condition ⓘ
- Demographics
- Encounter ⓘ
- Medication Statement ⓘ
- Medication Order ⓘ
- Observation ⓘ
- Parameters
- Procedure ⓘ

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CDS Authoring Tool: Inclusions

And ▾

+ Add element Base Elements ▾ Select Base Element ▴

10-yr CVD Risk

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---	--	---



CDS Authoring Tool: Inclusions

And

Observation: 10-yr CVD Risk >= 7.5%

Element must have return type 'boolean'. Add expression(s) to change the return type.

A

most recent

verified

observation with a code from

Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013

Base Element:

10-yr CVD Risk

Return Type:

System Quantity

Add Expression

And

+ Add element

Choose element type



CDS Authoring Tool: Inclusions

And ▾

Observation: 10-yr CVD Risk \geq 7.5% ☰ ☺ ✕

Element must have return type 'boolean'. Add expression(s) to change the return type.

A most recent verified **observation** with a code from

Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013

Base Element: 10-yr CVD Risk 🔗

Return Type: System Quantity

Add Expression Value Comparison Convert Units Is (Not) Null?

And ▾

+ Add element Choose element type ▾



CDS Authoring Tool: Inclusions

And ▼

Observation: 10-yr CVD Risk >= 7.5%

There exists a **most recent** **verified** **observation** with a code from
Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013 whose value is
greater than or equal to 7.5 %

Base Element: 10-yr CVD Risk

Expressions: >= × ▼ 7.5 maxOp ▼ maxValve % 🔍

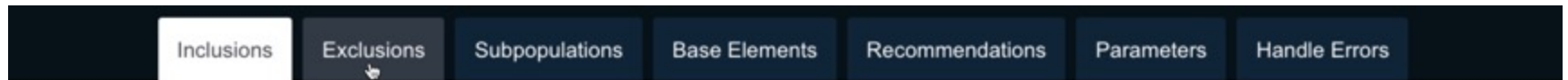
Return Type: ✓ Boolean

Add Expression

And ▼



CDS Authoring Tool: Exclusions



Age 40 - 75:



The patient's age is between 40 years and 75 years

And

LDL > 130:



There exists a most recent verified observation with a code from LDL Test whose value is greater than 130 mg/dL

And

10-yr CVD Risk >= 7.5%:



There exists a most recent verified observation with a code from Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013 whose value is

CDS Authoring Tool: Exclusions

InclusionsExclusionsSubpopulationsBase ElementsRecommendationsParametersHandle Errors

+ Add element

Choose element type

Allergy Intolerance

Base Elements

Condition

Demographics

Encounter

Medication Statement

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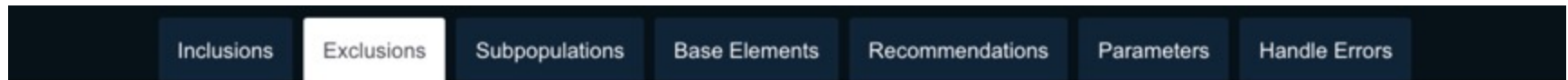
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CDS Authoring Tool: Exclusions



+ Add element Medication Order

✓ VSAC Authenticated Add Value Set Add Code

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CDS Authoring Tool: Exclusions

Choose Value Sets

Statin

Search

Close



CDS Authoring Tool: Exclusions

Choose Value Sets

11

Statin

Search

High intensity statin therapy 2.16.840.1.113762.1.4.1047.97	QIP	11
High Intensity Statin Therapy/Branded 2.16.840.1.113762.1.4.1032.18	MITRE Steward	10
Low Intensity Statin Therapy/Branded 2.16.840.1.113762.1.4.1032.16	MITRE Steward	10
Statin Allergen 2.16.840.1.113883.3.117.1.7.1.423	TJC EH Steward	7
Statin ingredient specific 2.16.840.1.113762.1.4.1021.7	TJC EH Steward	7

Close

CDS Authoring Tool: Exclusions

Choose Value Sets

1

←
High Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.18)

Select

CODE	NAME	CODE SYSTEM
1245449	ezetimibe 10 MG / Simvastatin 80 MG Oral Tablet [Vytorin]	RXNORM
262095	atorvastatin 80 MG Oral Tablet [Lipitor]	RXNORM
617320	atorvastatin 40 MG Oral Tablet [Lipitor]	RXNORM
750207	Amlodipine 10 MG / atorvastatin 40 MG Oral Tablet [Caduet]	RXNORM
750211	Amlodipine 10 MG / atorvastatin 80 MG Oral Tablet [Caduet]	RXNORM
750215	Amlodipine 2.5 MG / atorvastatin 40 MG Oral Tablet [Caduet]	RXNORM

Close



CDS Authoring Tool: Exclusions

Inclusions

Exclusions

Subpopulations

Base Elements

Recommendations

Parameters

Handle Errors

Medication Order: High Intensity Statin Therapy/I

Element must have return type 'boolean'. Add expression(s) to change the return type.

Medication orders with a code from High Intensity Statin Therapy/Branded

Value Set: High Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.18)

Return Type: List Of Medication Orders

Add Expression

✓ VSAC Authenticated

Add Value Set

Add Code

Select one

CDS Authoring Tool: Exclusions

Choose Value Sets
11

Search

Moderate intensity statin therapy 2.16.840.1.113762.1.4.1047.98	QIP	28
Moderate Intensity Statin Therapy/Branded 2.16.840.1.113762.1.4.1032.17	MITRE Steward	24
Low intensity statin therapy 2.16.840.1.113762.1.4.1047.107	QIP	13
High intensity statin therapy 2.16.840.1.113762.1.4.1047.97	QIP	11
High Intensity Statin Therapy/Branded 2.16.840.1.113762.1.4.1032.18	MITRE Steward	10

Close



CDS Authoring Tool: Exclusions

Choose Value Sets

← Moderate Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.17)

Select

CODE	NAME	CODE SYSTEM
103919	fluvastatin 40 MG Oral Capsule [Lescol]	RXNORM
104491	Simvastatin 20 MG Oral Tablet [Zocor]	RXNORM
1245430	ezetimibe 10 MG / Simvastatin 20 MG Oral Tablet [Vytorin]	RXNORM
1245441	ezetimibe 10 MG / Simvastatin 40 MG Oral Tablet [Vytorin]	RXNORM
152923	Simvastatin 40 MG Oral Tablet [Zocor]	RXNORM
206258	Lovastatin 40 MG Oral Tablet [Mevacor]	RXNORM

Close



CDS Authoring Tool: Exclusions

Inclusions

Exclusions

Subpopulations

Base Elements

Recommendations

Parameters

Handle Errors

Medication Order: High Intensity Statin Therapy/I

Element must have return type 'boolean'. Add expression(s) to change the return type.

Medication orders with a code from High Intensity Statin Therapy/Branded or Moderate Intensity Statin Therapy/Branded

Value Set 1: High Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.18)

Value Set 2: Moderate Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.17)

Return Type: List Of Medication Orders

Add Expression

VSAC Authenticated

Add Value Set

Add Code



CDS Authoring Tool: Exclusions

Choose Value Sets

11

Search

High intensity statin therapy 2.16.840.1.113762.1.4.1047.97	QIP	11
High Intensity Statin Therapy/Branded 2.16.840.1.113762.1.4.1032.18	MITRE Steward	10
Low Intensity Statin Therapy/Branded 2.16.840.1.113762.1.4.1032.16	MITRE Steward	10
Statin Allergen 2.16.840.1.113883.3.117.1.7.1.423	TJC EH Steward	7
Statin ingredient specific 2.16.840.1.113762.1.4.1021.7	TJC EH Steward	7

Close



CDS Authoring Tool: Exclusions

Choose Value Sets

← Low Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.16)

Select

CODE	NAME	CODE SYSTEM
103918	fluvastatin 20 MG Oral Capsule [Lescol]	RXNORM
103919	fluvastatin 40 MG Oral Capsule [Lescol]	RXNORM
104490	Simvastatin 10 MG Oral Tablet [Zocor]	RXNORM
1245420	ezetimibe 10 MG / Simvastatin 10 MG Oral Tablet [Vytorin]	RXNORM
206257	Lovastatin 20 MG Oral Tablet [Mevacor]	RXNORM
208220	Simvastatin 5 MG Oral Tablet [Zocor]	RXNORM

Close



CDS Authoring Tool: Exclusions

Inclusions

Exclusions

Subpopulations

Base Elements

Recommendations

Parameters

Handle Errors

Medication Order:

On Statin Therapy



Element must have return type 'boolean'. Add expression(s) to change the return type.

Medication orders with a code from High Intensity Statin Therapy/Branded ,

Moderate Intensity Statin Therapy/Branded , or Low Intensity Statin Therapy/Branded

Value Set 1: High Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.18)



Value Set 2: Moderate Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.17)



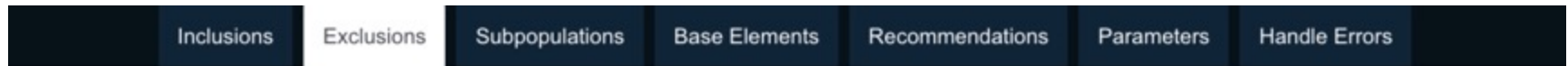
Value Set 3: Low Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.16)



Return Type: List Of Medication Orders

Add Expression







CDS Authoring Tool: Exclusions



Medication Order:

Element must have return type 'boolean'. Add expression(s) to change the return type.

Medication orders with a code from ,
 , or

Value Set 1:	High Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.18)	 
Value Set 2:	Moderate Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.17)	 
Value Set 3:	Low Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.16)	 

Return Type: List Of Medication Orders

CDS Authoring Tool: Exclusions

Medication Order:

Element must have return type 'boolean'. Add expression(s) to change the return type.

Active medication orders with a code from High Intensity Statin Therapy/Branded ,
Moderate Intensity Statin Therapy/Branded , or Low Intensity Statin Therapy/Branded

Value Set 1:	High Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.18)	👁️ ✕
Value Set 2:	Moderate Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.17)	👁️ ✕
Value Set 3:	Low Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.16)	👁️ ✕
Expressions:	Active	✕
Return Type:	List Of Medication Orders	



CDS Authoring Tool: Exclusions

Medication Order:

There **exists** an **active** medication order with a code from **High Intensity Statin Therapy/Branded** ,
Moderate Intensity Statin Therapy/Branded , or **Low Intensity Statin Therapy/Branded**

Value Set 1:	High Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.18)	
Value Set 2:	Moderate Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.17)	
Value Set 3:	Low Intensity Statin Therapy/Branded (2.16.840.1.113762.1.4.1032.16)	
Expressions:	Active	
	Exists	
Return Type:	<input checked="" type="checkbox"/> Boolean	

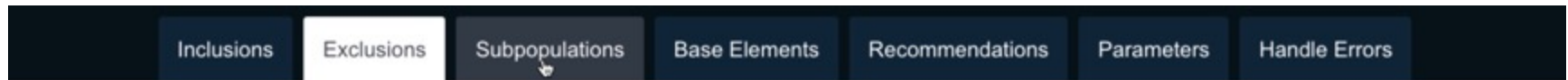
Add Expression

☒ VSAC Authenticated

Add Value Set

Add Code

CDS Authoring Tool: Subpopulations



On Statin Therapy: » ✕

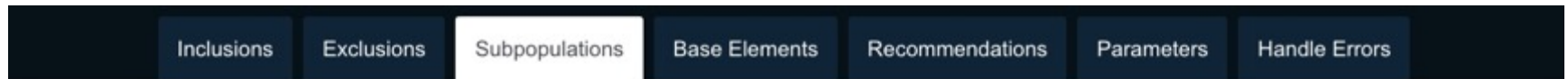
There **exists** an **active** medication order with a code from **High Intensity Statin Therapy/Branded** ,
Moderate Intensity Statin Therapy/Branded , or **Low Intensity Statin Therapy/Branded**

Select one ▾

+ Add element Choose element type ▾

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---	--	--

CDS Authoring Tool: Subpopulations



Subpopulation 1

Done

✕

This subpopulation needs at least one element

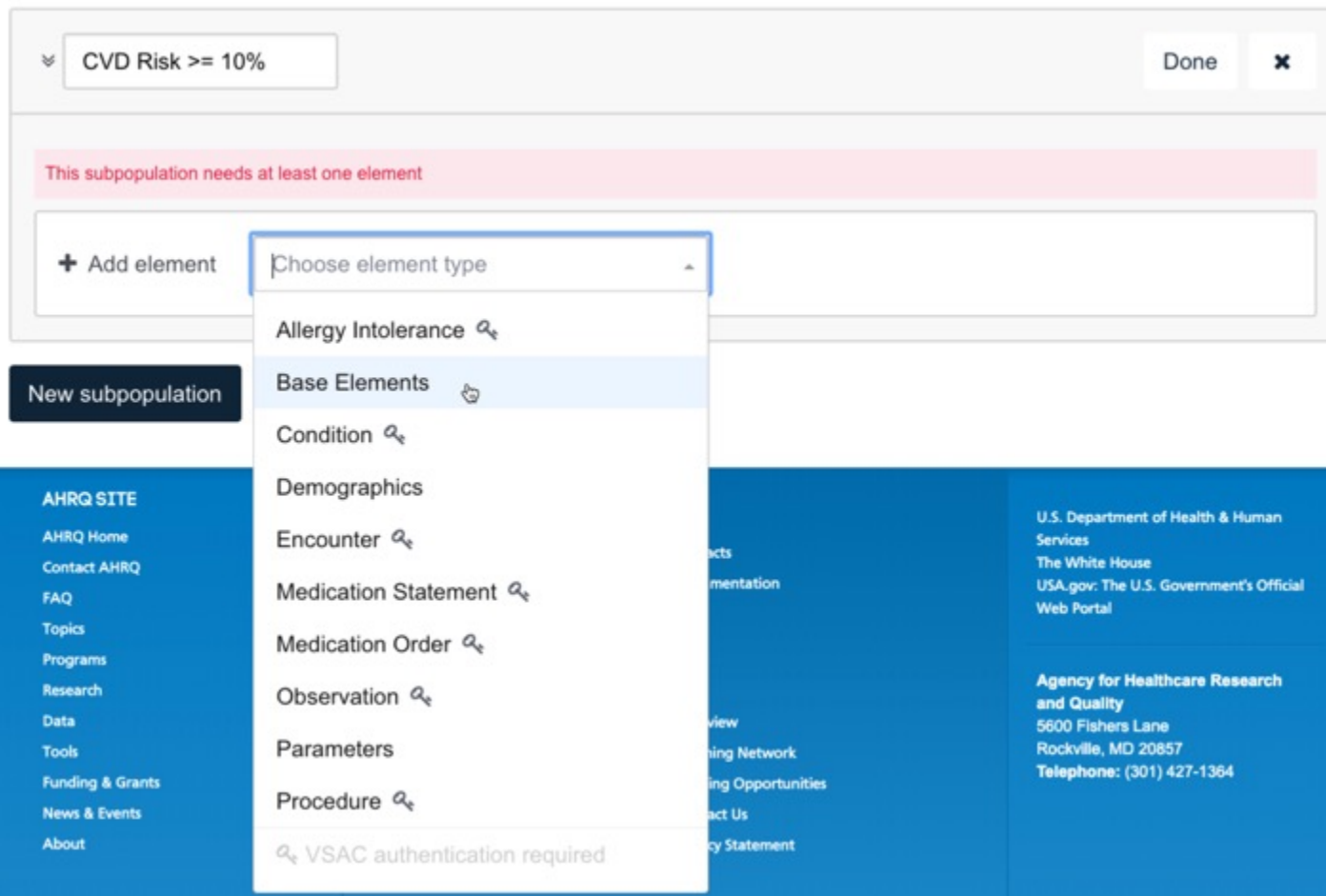
+ Add element

Choose element type

New subpopulation

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CDS Authoring Tool: Subpopulations



The screenshot shows the CDS Authoring Tool interface for creating subpopulations. At the top, a filter box contains the text "CVD Risk >= 10%". To the right of this box are "Done" and "x" buttons. Below the filter box is a pink error message: "This subpopulation needs at least one element". Underneath the error message is a box with a "+ Add element" button and a dropdown menu labeled "Choose element type". The dropdown menu is open, showing a list of element types: "Allergy Intolerance", "Base Elements" (which is highlighted with a mouse cursor), "Condition", "Demographics", "Encounter", "Medication Statement", "Medication Order", "Observation", "Parameters", and "Procedure". At the bottom left of the interface is a "New subpopulation" button. The bottom of the screen features a blue footer with navigation links on the left, a central content area, and contact information on the right.

CVD Risk >= 10%

Done x

This subpopulation needs at least one element

+ Add element Choose element type

- Allergy Intolerance
- Base Elements
- Condition
- Demographics
- Encounter
- Medication Statement
- Medication Order
- Observation
- Parameters
- Procedure
- VSAC authentication required

New subpopulation

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CDS Authoring Tool: Subpopulations

CVD Risk \geq 10%

Done

✕

This subpopulation needs at least one element

+ Add element

Base Elements

Select Base Element

10-yr CVD Risk

New subpopulation

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CDS Authoring Tool: Subpopulations

CVD Risk \geq 10%

Done

Observation:

10-yr CVD Risk \geq 10%

Element must have return type 'boolean'. Add expression(s) to change the return type.

A

most recent

verified

observation with a code from

Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013

Base Element:

10-yr CVD Risk

Return Type:

System Quantity

Add Expression

Select one

89



CDS Authoring Tool: Subpopulations

CVD Risk >= 10%

Done

X

Observation:

10-yr CVD Risk >= 10%

☰

⌵

X

Element must have return type 'boolean'. Add expression(s) to change the return type.

A

most recent

verified

observation with a code from

Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013

Base Element:

 10-yr CVD Risk

Return Type:

 System Quantity

Add Expression

Value Comparison

Convert Units

Is (Not) Null?

Select one



CDS Authoring Tool: Subpopulations

CVD Risk >= 10%

Done

Observation: 10-yr CVD Risk >= 10%

There exists a **most recent** **verified** **observation** with a code from
Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013 whose value is
greater than or equal to 10 %

Base Element: 10-yr CVD Risk

Expressions: >= x 10 maxOp maxVal %

Return Type: ☒ Boolean

Add Expression



CDS Authoring Tool: Subpopulations

» CVD Risk \geq 10%

Edit



New subpopulation

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CDS Authoring Tool: Subpopulations

» CVD Risk \geq 10%
 Edit
✕

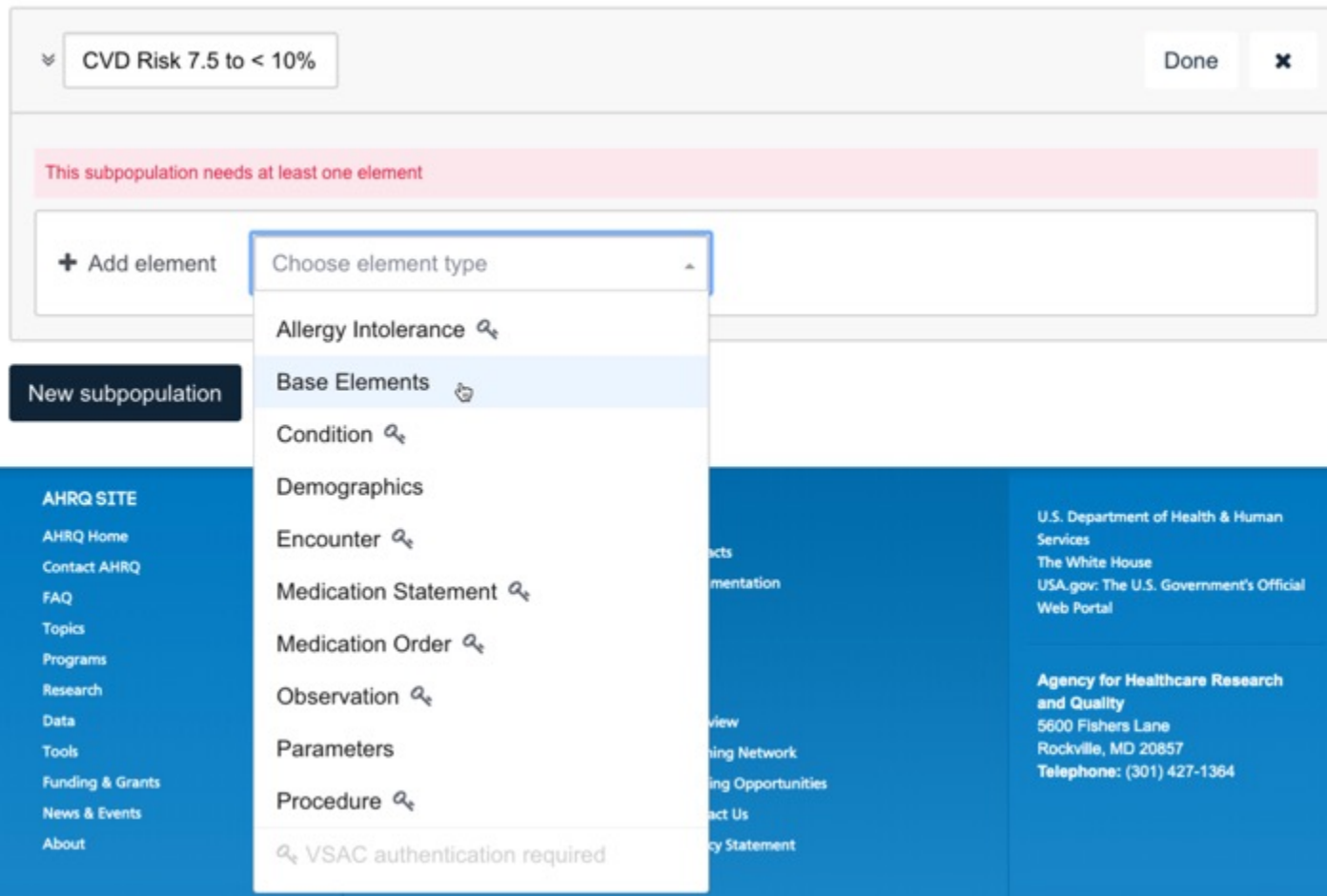
≡ Subpopulation 2
 Done
✕

This subpopulation needs at least one element

+ Add element
Choose element type

New subpopulation

CDS Authoring Tool: Subpopulations



The screenshot shows the CDS Authoring Tool interface for subpopulations. At the top, a dropdown menu is set to "CVD Risk 7.5 to < 10%". Below this, a pink message bar states "This subpopulation needs at least one element". A "+ Add element" button is visible. A dropdown menu titled "Choose element type" is open, showing options: Allergy Intolerance, Base Elements (highlighted), Condition, Demographics, Encounter, Medication Statement, Medication Order, Observation, Parameters, and Procedure. A "New subpopulation" button is located below the dropdown. The footer contains a navigation menu for the AHRQ site, contact information for the U.S. Department of Health & Human Services, and the Agency for Healthcare Research and Quality.

CVD Risk 7.5 to < 10%

Done

This subpopulation needs at least one element

+ Add element

Choose element type

- Allergy Intolerance
- Base Elements
- Condition
- Demographics
- Encounter
- Medication Statement
- Medication Order
- Observation
- Parameters
- Procedure

VSAC authentication required

New subpopulation

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CDS Authoring Tool: Subpopulations

CVD Risk 7.5 to < 10%

Done

✕

This subpopulation needs at least one element

+ Add element

Base Elements

Select Base Element

10-yr CVD Risk

New subpopulation

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CDS Authoring Tool: Subpopulations

CVD Risk 7.5 to < 10%

Done

X

Observation: 10-yr CVD Risk

☰

☑

X

Element must have return type 'boolean'. Add expression(s) to change the return type.

A

most recent

verified

 observation with a code from

Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013

Base Element: 10-yr CVD Risk

Return Type: System Quantity

Add Expression

Select one



CDS Authoring Tool: Subpopulations

CVD Risk 7.5 to < 10%

Done

X

Observation:

10-yr CVD Risk

☰

▼

X

Element must have return type 'boolean'. Add expression(s) to change the return type.

A

most recent

verified

observation with a code from

Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013

Base Element: 10-yr CVD Risk

Return Type: System Quantity

Add Expression

Value Comparison

Convert Units

Is (Not) Null?

Select one



CDS Authoring Tool: Subpopulations

CVD Risk 7.5 to < 10%

Done

Observation: 10-yr CVD Risk

Warning: This use of the Base Element has changed. Choose another name.

There exists a **most recent** **verified** **observation** with a code from
Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013 whose value is
greater than or equal to 7.5 % and less than 10 %


Base Element: 10-yr CVD Risk



Expressions: \geq 7.5 $<$ 10 %

Return Type: ☒ Boolean

Add Expression

CDS Authoring Tool: Recommendations

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» CVD Risk $\geq 10\%$ [Edit](#) [✕](#)


» CVD Risk 7.5 to $< 10\%$ [Edit](#) [✕](#)

New subpopulation

CDS Authoring Tool: Recommendations

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Recommend... 


Describe your recommendation



Add rationale

Add subpopulation

New recommendation

CDS Authoring Tool: Recommendations

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Inclusions

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Subpopulations

Base Elements

Recommendations

Parameters

Handle Errors

If all of the following apply...

Add a subpopulation


Doesn't Meet Inclusion Criteria

Meets Exclusion Criteria

CVD Risk $\geq 10\%$

CVD Risk 7.5 to $< 10\%$

New subpopulation




Add rationale

New recommendation



CDS Authoring Tool: Recommendations

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Inclusions

Exclusions

Subpopulations

Base Elements

Recommendations

Parameters

Handle Errors

If all of the following apply...

CVD Risk \geq 10%

Add a subpopulation

New subpopulation

Recommend...

Start low to moderate intensity lipid lowering therapy (Grade B)

Add rationale

New recommendation

CDS Authoring Tool: Recommendations

Recommend...
✕

Describe your recommendation

Add rationale
Add subpopulation

New recommendation

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CDS Authoring Tool: Recommendations

If all of the following apply...

Add a subpopulation

Doesn't Meet Inclusion Criteria

Meets Exclusion Criteria

CVD Risk $\geq 10\%$

CVD Risk 7.5 to $< 10\%$

New subpopulation

Add rationale

New recommendation

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CDS Authoring Tool: Recommendations

If all of the following apply...

CVD Risk 7.5 to < 10% ✕

Add a subpopulation ▼ [New subpopulation](#)

Recommend... ✕

Discuss low to moderate intensity lipid lowering therapy (Grade C)

[Add rationale](#)

[New recommendation](#)

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CDS Authoring Tool: Handle Errors

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Inclusions

Exclusions

Subpopulations

Base Elements

Recommendations

Parameters

Handle Errors

Deliver first recommendation

If all of the following apply...

CVD Risk \geq 10%



Add a subpopulation



New subpopulation


Recommend...





Start low to moderate intensity lipid lowering therapy (Grade B)

Add rationale

CDS Authoring Tool: Handle Errors

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Save 

InclusionsExclusionsSubpopulationsBase ElementsRecommendationsParametersHandle Errors


Errors

If

Select...

Recommendations is null

Doesn't Meet Inclusion Criteria

Meets Exclusion Criteria 

CVD Risk $\geq 10\%$


CVD Risk 7.5 to $< 10\%$


Or Else If...


Else



CDS Authoring Tool: Parameters

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Inclusions

Exclusions

Subpopulations

Base Elements

Recommendations

Parameters

Handle Errors

Errors

If

Meets Exclusion Criteria

✕ ▾

And Also If...

Then


Recommendation not provided since patient meets exclusion criteria


Or Else If...


Else



CDS Authoring Tool: Parameters

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New parameter


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CDS Authoring Tool: Parameters

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[Base Elements](#)

[Recommendations](#)

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[Handle Errors](#)

Parameter Name:

Parameter Type:

New parameter

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CDS Authoring Tool: Parameters

InclusionsExclusionsSubpopulationsBase ElementsRecommendationsParametersHandle Errors

Parameter Name: Allow Grade C

Parameter Type:

Select...

BooleanCodeConceptIntegerDateTimeDecimalQuantityStringTimeInterval<Integer>

New parameter

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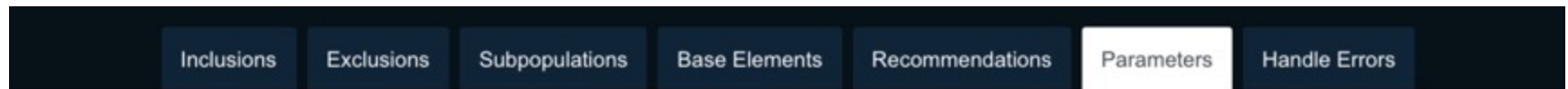
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Rockville, MD 20857

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CDS Authoring Tool: Parameters



Parameter Name: ✕

Parameter Type:

Default Value:

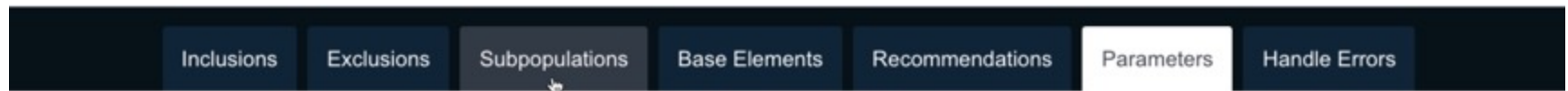
True

False

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CDS Authoring Tool: Parameters



Parameter Name: ✕

Parameter Type: ▼

Default Value: ✕ ▼

New parameter

AHRQ SITE <ul style="list-style-type: none">AHRQ HomeContact AHRQFAQTopicsProgramsResearchDataToolsPublications & Grants	CDS AUTHORIZING TOOL SITE <ul style="list-style-type: none"> CDS Authoring Tool Home<ul style="list-style-type: none">CDS Authoring Tool HomeWorkspaceFeedbackCDS SITE<ul style="list-style-type: none">CDS HomeCDS ConnectArtifactsDocumentationOverviewLearning Network	U.S. Department of Health & Human Services <ul style="list-style-type: none">The White HouseUSA.gov: The U.S. Government's Official Web Portal <hr/> Agency for Healthcare Research and Quality <ul style="list-style-type: none">5600 Fishers LaneRockville, MD 20857Telephone: (301) 427-1364
---	---	--

CDS Authoring Tool: Parameters

Inclusions

Exclusions

Subpopulations

Base Elements

Recommendations

Parameters

Handle Errors

⌵ CVD Risk >= 10% Done ✕

Observation: 10-yr CVD Risk >= 10% ⌵ ✕

There exists a most recent verified **observation** with a code from
Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013 whose value is
greater than or equal to 10 %

Base Element: 10-yr CVD Risk ⌵

Expressions: >= ✕ 10 maxOp maxValue % Q ✕

Return Type: ☒ Boolean

CDS Authoring Tool: Parameters

CVD Risk 7.5 to < 10%

Done

Observation:

10-yr CVD Risk 7.5 to < 10%

There exists a

most recent

verified

 observation with a code from

Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013

whose value is

greater than or equal to 7.5 % and less than 10 %

Base Element:

10-yr CVD Risk

Expressions:

>=

x

7.5

<

x

10

%

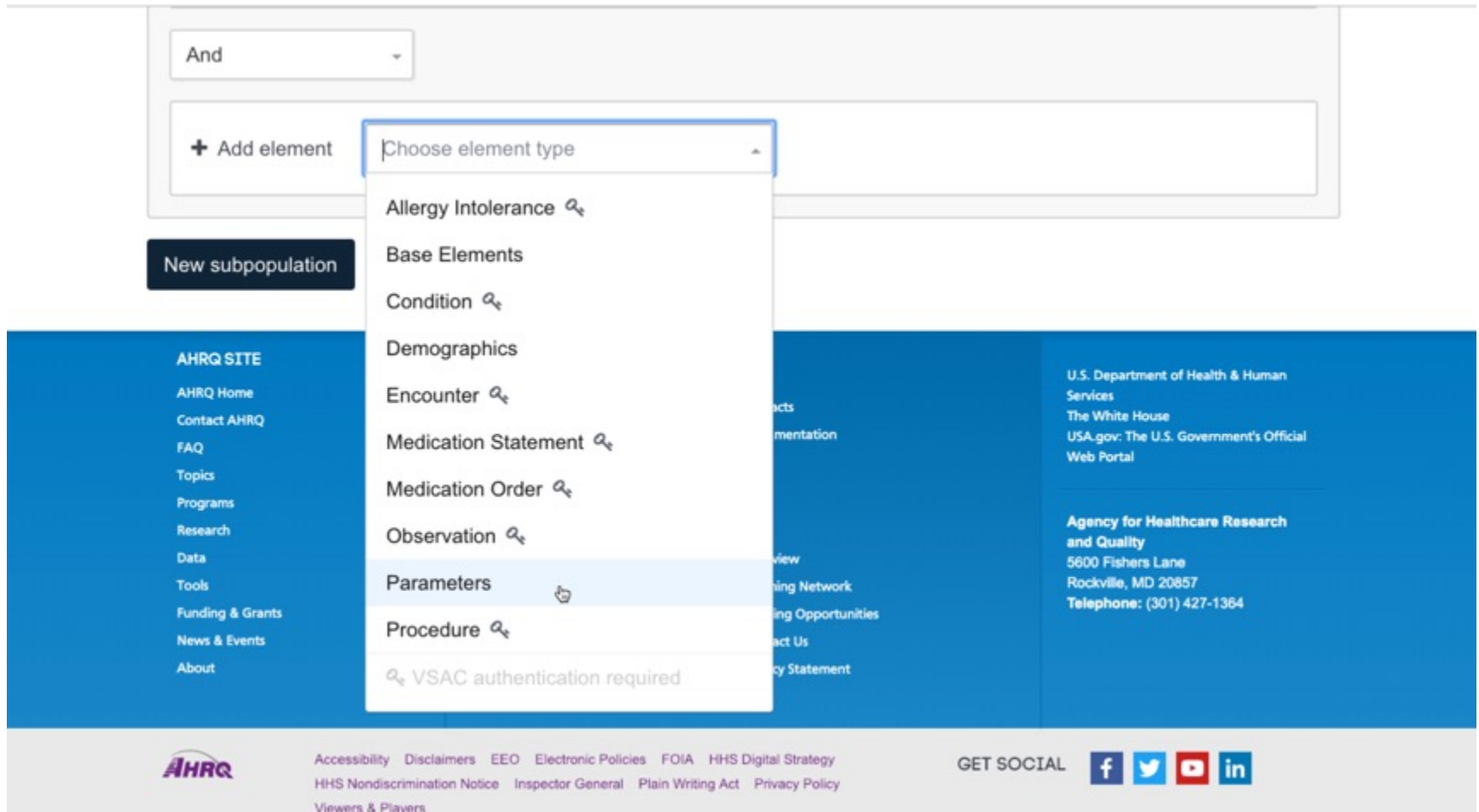
Q

Return Type:

☒ Boolean

Add Expression

CDS Authoring Tool: Parameters



The screenshot displays the CDS Authoring Tool interface. At the top, there is a dropdown menu set to 'And'. Below it, a '+ Add element' button is visible. A 'New subpopulation' button is located to the left of the main content area. The central focus is a dropdown menu titled 'Choose element type', which lists several options: Allergy Intolerance, Base Elements, Condition, Demographics, Encounter, Medication Statement, Medication Order, Observation, Parameters (highlighted with a mouse cursor), and Procedure. At the bottom of this list, a note indicates 'VSAC authentication required'. The left sidebar contains a navigation menu for the AHRQ site, including links to Home, Contact, FAQ, Topics, Programs, Research, Data, Tools, Funding & Grants, News & Events, and About. The right sidebar provides contact information for the U.S. Department of Health & Human Services, The White House, and the Agency for Healthcare Research and Quality. The footer includes the AHRQ logo, a list of links (Accessibility, Disclaimers, EEO, Electronic Policies, FOIA, HHS Digital Strategy, HHS Nondiscrimination Notice, Inspector General, Plain Writing Act, Privacy Policy, Viewers & Players), a 'GET SOCIAL' section with icons for Facebook, Twitter, YouTube, and LinkedIn, and the page number 116.

And

+ Add element

Choose element type

- Allergy Intolerance
- Base Elements
- Condition
- Demographics
- Encounter
- Medication Statement
- Medication Order
- Observation
- Parameters**
- Procedure

VSAC authentication required

New subpopulation

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f t y in

CDS Authoring Tool: Parameters

And ▾


+ Add element Parameters ▾

Select Parameters element ▾

Allow Grade C





New subpopulation

<p>AHRQ SITE</p> <ul style="list-style-type: none"> AHRQ Home Contact AHRQ FAQ Topics Programs Research Data Tools Funding & Grants News & Events About 	<p>CDS AUTHORIZING TOOL SITE</p> <ul style="list-style-type: none"> CDS Authoring Tool Home Workspace Feedback <p>CDS SITE</p> <ul style="list-style-type: none"> CDS Home CDS Connect Evaluation Resources Disclaimer for CDS Connect 	<p>Artifacts</p> <ul style="list-style-type: none"> Documentation <p>Overview</p> <ul style="list-style-type: none"> Learning Network Funding Opportunities Contact Us Privacy Statement 	<p>U.S. Department of Health & Human Services The White House USA.gov: The U.S. Government's Official Web Portal</p> <p>Agency for Healthcare Research and Quality 5600 Fishers Lane Rockville, MD 20857 Telephone: (301) 427-1384</p>
---	--	---	---



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HHS Nondiscrimination Notice Inspector General Plain Writing Act Privacy Policy
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CDS Authoring Tool: Parameters

And

Allow Grade C

The value of the **boolean** parameter is met

Return Type: ☒ Boolean

Add Expression


And


+ Add element


Choose element type

New subpopulation

CDS Authoring Tool: Save


Statin Use Demo

 Download CQL ▾

 Save

Inclusions

Exclusions

Subpopulations

Base Elements

Recommendations

Parameters

Handle Errors

» CVD Risk $\geq 10\%$

Edit

✕


» CVD Risk 7.5 to $< 10\%$

Edit

✕

New subpopulation

CDS Authoring Tool: Save

 **Statin Use Demo**

[Download CQL](#) [Save](#)

Last saved Friday, January 18th 2019, 8:56:37 am.

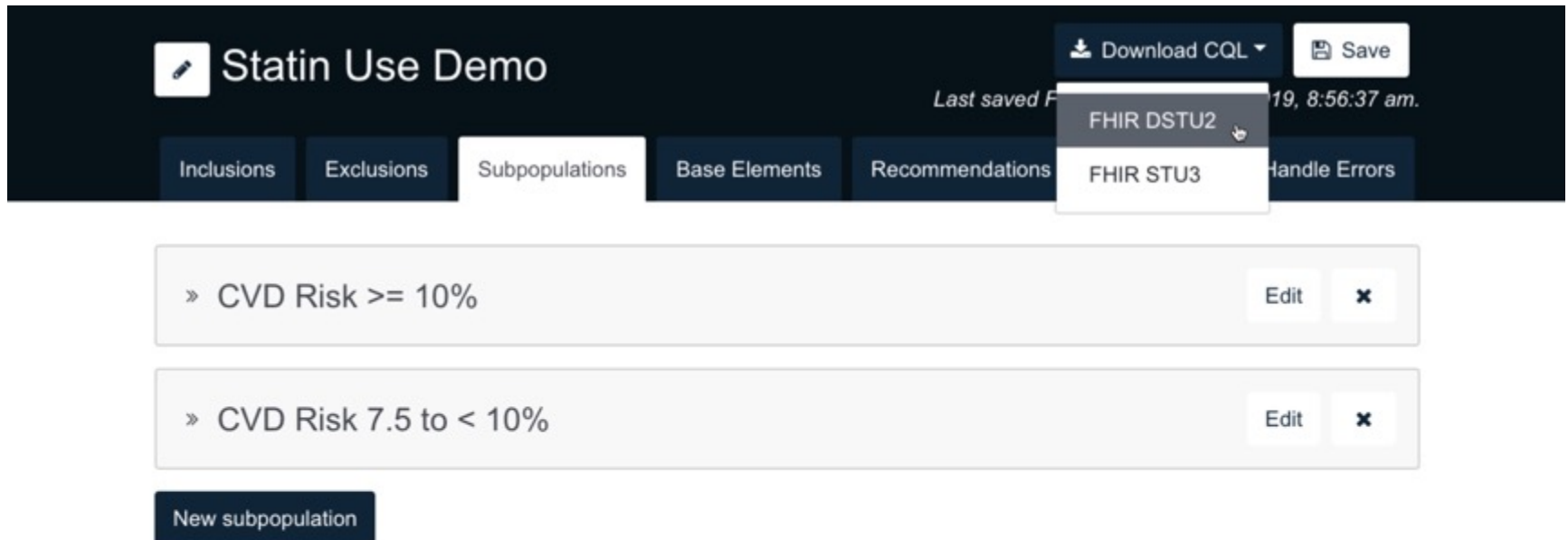
[Inclusions](#) [Exclusions](#) [Subpopulations](#) [Base Elements](#) [Recommendations](#) [Parameters](#) [Handle Errors](#)

» CVD Risk \geq 10% [Edit](#) [✕](#)

» CVD Risk 7.5 to $<$ 10% [Edit](#) [✕](#)

New subpopulation

CDS Authoring Tool: Download



Statin Use Demo

Download CQL ▾ Save

Last saved F... 19, 8:56:37 am.

FHIR DSTU2
FHIR STU3

Inclusions Exclusions **Subpopulations** Base Elements Recommendations Handle Errors

» CVD Risk $\geq 10\%$ Edit ✕

» CVD Risk 7.5 to $< 10\%$ Edit ✕

New subpopulation

CDS Authoring Tool: Download

Statin Use Demo

Download CQL Save

Downloaded Friday, January 18th 2019, 8:57:13 am.

InclusionsExclusionsSubpopulationsBase ElementsRecommendationsParametersHandle Errors

» CVD Risk $\geq 10\%$ Edit X

» CVD Risk 7.5 to $< 10\%$ Edit X

New subpopulation

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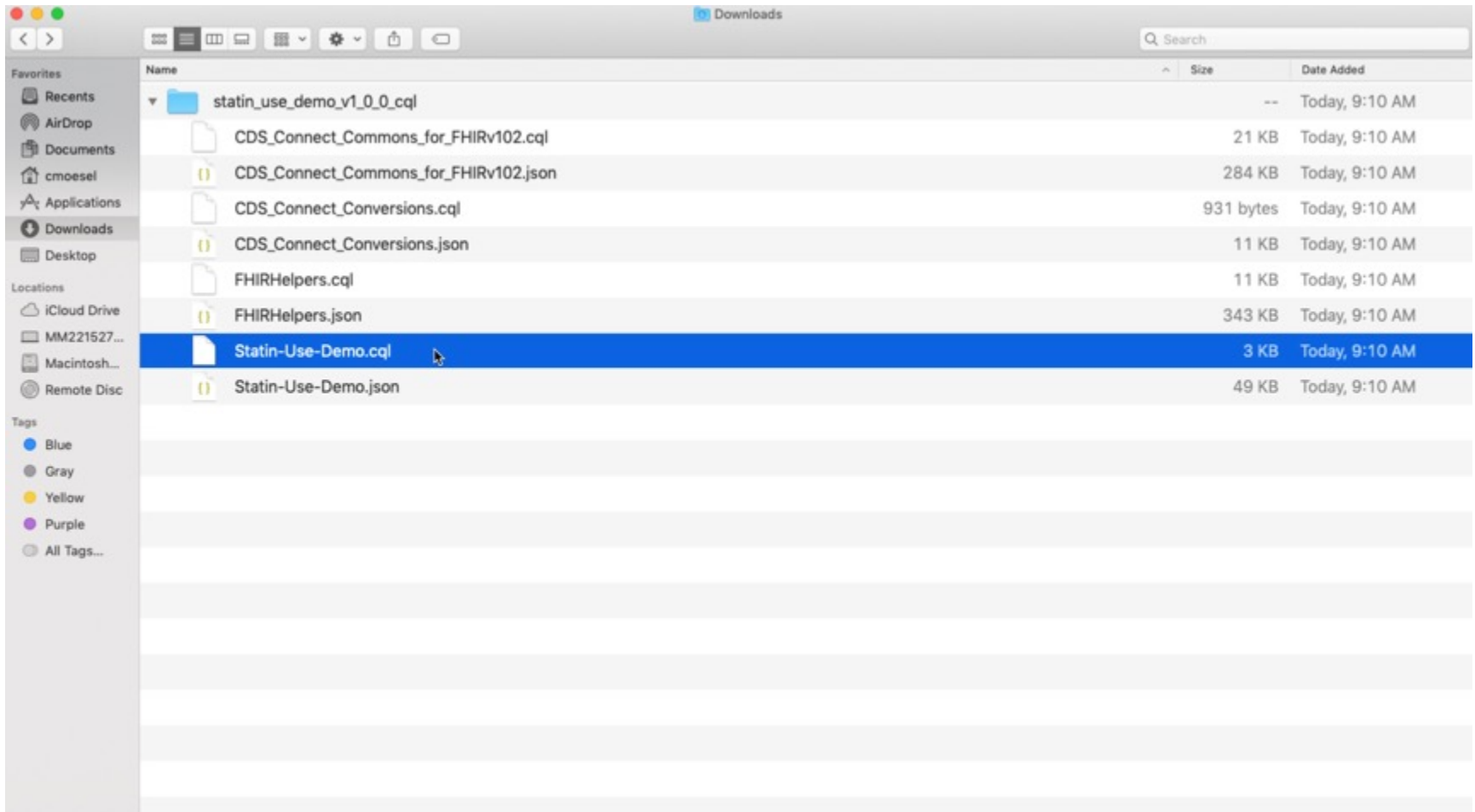
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statin_use_demo_v1_0_0_cql.zip

Show All X



CDS Authoring Tool: Download





CDS Authoring Tool: Download

The screenshot shows a code editor window titled "Statin-Use-Demo.cql". The editor contains the following code:

```
1  library "Statin-Use-Demo" version '1.0.0'
2
3  using FHIR version '1.0.2'
4  include FHIRHelpers version '1.0.2' called FHIRHelpers
5  include CDS_Connect_Commons_for_FHIRv102 version '1.3.0' called C3F
6  include CDS_Connect_Conversions version '1' called Convert
7
8  codesystem "LOINC": 'http://loinc.org'
9  valueset "LDL Test VS": '2.16.840.1.113883.3.464.1003.198.11.1029'
10 valueset "High Intensity Statin Therapy/Branded VS": '2.16.840.1.113762.1.4.1032.18'
11 valueset "Moderate Intensity Statin Therapy/Branded VS": '2.16.840.1.113762.1.4.1032.17'
12 valueset "Low Intensity Statin Therapy/Branded VS": '2.16.840.1.113762.1.4.1032.16'
13
14 code "79423-0 Code": '79423-0' from "LOINC"
15   display 'Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013'
16 concept "LOINC 79423-0 Concept" : { "79423-0 Code"}
17   display 'Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013 Concept Display'
18
19 parameter "Allow Grade C" default true
20
21 context Patient
22
23 define "generic_medication_order_valuesets":
24   [MedicationOrder: "High Intensity Statin Therapy/Branded VS"]
25   union [MedicationOrder: "Moderate Intensity Statin Therapy/Branded VS"]
26   union [MedicationOrder: "Low Intensity Statin Therapy/Branded VS"]
27
```

The interface includes a sidebar with icons for file management, search, and other tool functions. The status bar at the bottom indicates the current position (Ln 68, Col 34), spacing (Spaces: 2), encoding (UTF-8), line endings (CRLF), and the query language (CQL).



CDS Authoring Tool: Download

The screenshot displays the CDS Authoring Tool interface with a dark theme. The main editor window shows a CQL script titled "Statin-Use-Demo.cql". The script defines several measures for identifying patients on statin therapy based on CVD risk and LDL levels. The left sidebar contains icons for file management, search, and other tool functions. The bottom status bar indicates the current position (Ln 68, Col 34) and settings (Spaces: 2, UTF-8, CRLF, CQL).

```
Statin-Use-Demo.cql x
28 define "10-yr CVD Risk":
29   C3F.QuantityValue(C3F.MostRecent(C3F.Verified([Observation: "LOINC 79423-0 Concept"])))
30
31 define "Age 40 - 75":
32   AgeInYears() >= 40 and AgeInYears() <= 75
33
34 define "LDL > 130":
35   C3F.QuantityValue(C3F.MostRecent(C3F.Verified([Observation: "LDL Test VS"]))) > 130 'mg/dL'
36
37 define "10-yr CVD Risk >= 7.5%":
38   "10-yr CVD Risk" >= 7.5 '%'
39
40 define "On Statin Therapy":
41   exists(C3F.ActiveMedicationOrder("generic_medication_order_valuesets"))
42
43 define "10-yr CVD Risk >= 10%":
44   "10-yr CVD Risk" >= 10 '%'
45
46 define "10-yr CVD Risk 7.5 to < 10%":
47   "10-yr CVD Risk" >= 7.5 '%'
48   and "10-yr CVD Risk" < 10 '%'
49
50 define "MeetsInclusionCriteria":
51   "Age 40 - 75"
52   and "LDL > 130"
53   and "10-yr CVD Risk >= 7.5%"
54
```

Ln 68, Col 34 Spaces: 2 UTF-8 CRLF CQL



CDS Authoring Tool: Download

The screenshot displays the CDS Authoring Tool interface with a dark theme. The main editor shows a CQL script titled "Statin-Use-Demo.cql". The script defines several measures: "MeetsExclusionCriteria", "CVD Risk >= 10%", "CVD Risk 7.5 to < 10%", "InPopulation", "Recommendation", and "Errors". The script is as follows:

```
55 define "MeetsExclusionCriteria":  
56   "On Statin Therapy"  
57  
58   define "CVD Risk >= 10%":  
59     if "InPopulation" is not true then  
60       null  
61     else  
62       "10-yr CVD Risk >= 10%"  
63  
64   define "CVD Risk 7.5 to < 10%":  
65     if "InPopulation" is not true then  
66       null  
67     else  
68       "10-yr CVD Risk 7.5 to < 10%" and "Allow Grade C"  
69  
70   define "InPopulation":  
71     "MeetsInclusionCriteria" and not "MeetsExclusionCriteria"  
72  
73   define "Recommendation":  
74     if "CVD Risk >= 10%" then 'Start low to moderate intensity lipid lowering therapy (Grade B)'  
75     else if "CVD Risk 7.5 to < 10%" then 'Discuss low to moderate intensity lipid lowering therapy (Grade C)'  
76     else null  
77  
78   define "Errors":  
79     if "MeetsExclusionCriteria" then  
80       {'Recommendation not provided since patient meets exclusion criteria'}  
81     else null
```

The status bar at the bottom indicates the current position is Line 49, Column 1, with 2 spaces, UTF-8 encoding, CRLF line endings, and CQL syntax.



CDS Authoring Tool: Testing



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Drop a valid JSON FHIR STU3 or DSTU2 bundle containing a synthetic patient here, or
click to browse.


*Do not upload any Personally Identifiable Information (PII) or Protected Health
Information (PHI) to this server. Upload synthetic data only.*

Execute CQL for a patient below.


CDS Authoring Tool: Testing

The screenshot displays the 'Clinical Decision Support Authoring' tool's 'Testing' interface. The header includes the U.S. Department of Health & Human Services and AHRQ logos, along with navigation links for Home, Artifacts, Workspace, Testing (active), Documentation, and Feedback. The main content area features a dashed box with a cloud upload icon and instructions: 'Drop a valid JSON FHIR STU3 or DSTU2 bundle containing a synthetic patient here, or click to browse.' A warning below states: 'Do not upload any Personally Identifiable Information (PII) or Protected Health Information (PHI) to this server. Upload synthetic data only.' A button at the bottom says 'Execute CQL for a patient below.' The footer contains links for AHRQ and CDS Authoring Tool sites. A file explorer window titled 'StatinUseLifePatients' is open on the right, showing a list of JSON files: 'High_CVD_Risk_Henry.json' (selected), 'Normal_Norma.json', and 'Statin_Stuart.json'.

CDS Authoring Tool: Testing


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High_CVD_Risk_Henry.json


Drop a valid JSON FHIR STU3 or DSTU2 bundle containing a synthetic patient here, or click to browse.

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Execute CQL for a patient below.

No patients to show.

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CDS Authoring Tool Home
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StatinUseLitePatients

Name
High_CVD_Risk_Henry.json
Normal_Norma.json
Statin_Stuart.json

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Drop a valid JSON FHIR STU3 or DSTU2 bundle containing a synthetic patient here, or click to browse.

Do not upload any Personally Identifiable Information (PII) or Protected Health Information (PHI) to this server. Upload synthetic data only.

Execute CQL for a patient below.

NAME	BIRTH DATE	GENDER	VERSION	LAST UPDATED	
High CVD Risk Henry	1975-01-10	male	DSTU2	a few seconds ago	 Execute CQL Delete

✓ VSAC Authenticated


StatinUseLifePatients

High_CVD_Risk_Henry.json


Normal_Norma.json

Statin_Stuart.json

CDS Authoring Tool: Testing


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Clinical Decision Support Authoring


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Drop a valid JSON FHIR STU3 or DSTU2 bundle containing a synthetic patient here, or click to browse.

Do not upload any Personally Identifiable Information (PII) or Protected Health Information (PHI) to this server. Upload synthetic data only.

Execute CQL for a patient below.

NAME	BIRTH DATE	GENDER	VERSION	LAST UPDATED	
High CVD Risk Henry	1975-01-10	male	DSTU2	a few seconds ago	 Execute CQL Delete

StatinUseLifePatients

Name

High_CVD_Risk_Henry.json
Normal_Norma.json
Statin_Stuart.json




CDS Authoring Tool: Testing

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Clinical Decision Support Authoring



Home Artifacts Workspace **Testing** Documentation Feedback



Drop a valid JSON FHIR STU3 or DSTU2 bundle containing a synthetic patient here, or click to browse.

Do not upload any Personally Identifiable Information (PII) or Protected Health Information (PHI) to this server. Upload synthetic data only.

Execute CQL for a patient below.

NAME	BIRTH DATE	GENDER	VERSION	LAST UPDATED	
Normal Norma	1966-12-05	female	DSTU2	a few seconds ago	 Execute CQL Delete
High CVD Risk Henry	1975-01-10	male	DSTU2	a few seconds ago	 Execute CQL Delete

VSAC Authenticated

AHRQ SITE CDS AUTHORIZING TOOL SITE U.S. Department of Health &

StatinUseLifePatients

Name

- High_CVD_Risk_Henry.json
- Normal_Norma.json
- Statin_Stuart.json




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Drop a valid JSON FHIR STU3 or DSTU2 bundle containing a synthetic patient here, or click to browse.

Do not upload any Personally Identifiable Information (PII) or Protected Health Information (PHI) to this server. Upload synthetic data only.

Execute CQL for a patient below.

NAME	BIRTH DATE	GENDER	VERSION	LAST UPDATED	
Normal Norma	1966-12-05	female	DSTU2	a few seconds ago	 Execute CQL Delete
High CVD Risk Henry	1975-01-10	male	DSTU2	a few seconds ago	 Execute CQL Delete


✓ VSAC Authenticated

StatinUseLifePatients

Name

- High_CVD_Risk_Henry.json
- Normal_Norma.json
- Statin_Stuart.json**

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 CDS AUTHORIZING TOOL SITE

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CDS Authoring Tool: Testing

The screenshot shows the main interface of the "Clinical Decision Support Authoring" application. At the top, there's a dark blue header with the title "PATIENT-CENTERED OUTCOMES RESEARCH" and navigation links for "CDS Home" and "chris.moesel". The main heading is "Clinical Decision Support Authoring". Below it are tabs for "Home", "Artifacts", "Workspace", "Testing" (which is active), "Documentation", and "Feedback".

In the center, there's a large dashed box containing a cloud upload icon and instructions: "Drop a valid JSON FHIR STU3 or DSTU2 bundle containing a synthetic patient here, or click to browse." A red warning message states: "Do not upload any Personally Identifiable Information (PII) or Protected Health Information (PHI) to this server. Upload synthetic data only."

Below this is a button labeled "Execute CQL for a patient below.". Underneath is a table listing three patients:

NAME	BIRTH DATE	GENDER	VERSION	LAST UPDATED	
Statin Stuart	1975-01-10	male	DSTU2	a few seconds ago	Execute CQL Delete
Normal Norma	1966-12-05	female	DSTU2	a few seconds ago	Execute CQL Delete
High CVD Risk Henry	1975-01-10	male	DSTU2	a minute ago	Execute CQL Delete

A status indicator "✓ VSAC Authenticated" is visible in the top right corner of the table area.

On the far right, a sidebar titled "Name" lists the files: "High_CVD_Risk_Henry.json", "Normal_Norma.json", and "Statin_Stuart.json".

CDS Authoring Tool: Testing



Drop a valid JSON FHIR STU3 or DSTU2 bundle containing a synthetic patient here, or click to browse.


Do not upload any Personally Identifiable Information (PII) or Protected Health Information (PHI) to this server. Upload synthetic data only.

Execute CQL for a patient below.

NAME	BIRTH DATE	GENDER	VERSION	LAST UPDATED	✓ VSAC Authenticated		
Statin Stuart	1975-01-10	male	DSTU2	a few seconds ago		Execute CQL	Delete
Normal Norma	1966-12-05	female	DSTU2	a few seconds ago		Execute CQL	Delete
High CVD Risk Henry	1975-01-10	male	DSTU2	a minute ago		Execute CQL	Delete

CDS Authoring Tool: Testing

View Patient Details



High CVD Risk Henry

male 44 yrs

ORGANIZATIONS (1)

CONDITIONS (10)

MEDICATIONS (2)

MEDICATION	DATE WRITTEN	STATUS
24 HR Metformin hydrochloride 500 MG Extended Release Oral Tablet	2006-02-03T20:06:17-05:00	active
Penicillin V Potassium 500 MG Oral Tablet	2014-02-17T20:06:17-05:00	stopped

CAREPLANS (2)

ENCOUNTERS (12)

OBSERVATIONS (103)

IMMUNIZATIONS (6)

PROCEDURES (5)



CDS Authoring Tool: Testing

OBSERVATIONS (103)

CATEGORY	TYPE	VALUE	EFFECTIVE	ISSUED
vital-signs	Body Height	178.37037857387472 cm	2009-02-06T20:06:17-05:00	2009-02-06T20:06:17.673-05:00
vital-signs	Body Weight	101.64361321253863 kg	2009-02-06T20:06:17-05:00	2009-02-06T20:06:17.673-05:00
vital-signs	Body Mass Index	31.9473343355157 kg/m2	2009-02-06T20:06:17-05:00	2009-02-06T20:06:17.673-05:00
vital-signs	Blood Pressure		2009-02-06T20:06:17-05:00	2009-02-06T20:06:17.673-05:00
laboratory	Glucose	146.25757095084364 mg/dL	2009-02-06T20:06:17-05:00	2009-02-06T20:06:17.673-05:00
laboratory	Urea Nitrogen	9.36989014400799 mg/dL	2009-02-06T20:06:17-05:00	2009-02-06T20:06:17.673-05:00
laboratory	Creatinine	1.4964198611845965 mg/dL	2009-02-06T20:06:17-05:00	2009-02-06T20:06:17.673-05:00
laboratory	Calcium	9.758209143838293 mg/dL	2009-02-06T20:06:17-05:00	2009-02-06T20:06:17.673-05:00
laboratory	Sodium	143.64113264981836 mmol/L	2009-02-06T20:06:17-05:00	2009-02-06T20:06:17.673-05:00
laboratory	Potassium	4.760691391730657	2009-02-	2009-02-



CDS Authoring Tool: Testing

		mmol/L	09T20:06:17-05:00	09T20:06:17.673-05:00
laboratory	Carbon Dioxide	23.414943814025904 mmol/L	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
laboratory	Total Cholesterol	217.18908248696656 mg/dL	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
laboratory	Triglycerides	153.3957157685174 mg/dL	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
laboratory	Low Density Lipoprotein Cholesterol	136.44788940072107 mg/dL	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
laboratory	High Density Lipoprotein Cholesterol	50.06204993254201 mg/dL	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
laboratory	Microalbumin Creatinine Ratio	2.9903271073954496 mg/g	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
laboratory	Estimated Glomerular Filtration Rate	87.73260513711118 mL/min/(1.73_m2)	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
survey	Tobacco smoking status NHIS	Current every day smoker	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
procedure	Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013	15.5 %	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
laboratory	Hemoglobin A1c/Hemoglobin.total in Blood	7.596367505946317 %	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00



CDS Authoring Tool: Testing

		mmol/L	09T20:06:17-05:00	09T20:06:17.673-05:00
laboratory	Carbon Dioxide	23.414943814025904 mmol/L	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
laboratory	Total Cholesterol	217.18908248696656 mg/dL	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
laboratory	Triglycerides	153.3957157685174 mg/dL	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
laboratory	Low Density Lipoprotein Cholesterol	136.44788940072107 mg/dL	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
laboratory	High Density Lipoprotein Cholesterol	50.06204993254201 mg/dL	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
laboratory	Microalbumin Creatinine Ratio	2.9903271073954496 mg/g	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
laboratory	Estimated Glomerular Filtration Rate	87.73260513711118 mL/min/(1.73_m2)	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
survey	Tobacco smoking status NHIS	Current every day smoker	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
procedure	Cardiovascular disease 10Y risk [Likelihood] ACC-AHA Pooled Cohort by Goff 2013	15.5 %	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00
laboratory	Hemoglobin A1c/Hemoglobin.total in Blood	7.596367505946317 %	2018-03-09T20:06:17-05:00	2018-03-09T20:06:17.673-05:00



CDS Authoring Tool: Testing



Drop a valid JSON FHIR STU3 or DSTU2 bundle containing a synthetic patient here, or click to browse.

Do not upload any Personally Identifiable Information (PII) or Protected Health Information (PHI) to this server. Upload synthetic data only.

Execute CQL for a patient below.

NAME	BIRTH DATE	GENDER	VERSION	LAST UPDATED	✓ VSAC Authenticated		
Statin Stuart	1975-01-10	male	DSTU2	5 minutes ago		Execute CQL	Delete
Normal Norma	1966-12-05	female	DSTU2	6 minutes ago		Execute CQL	Delete
High CVD Risk Henry	1975-01-10	male	DSTU2	6 minutes ago		Execute CQL	Delete



CDS Authoring Tool: Testing

Execute CQL

Executing on Patient:

Name: High CVD Risk Henry

Statin Use Demo

Cancel

Execute CQL



CDS Authoring Tool: Testing

CQL Execution Results

Patient: High CVD Risk Henry

Artifact: Statin Use Demo

MeetsInclusionCriteria



MeetsExclusionCriteria



Recommendation

Start low to moderate intensity lipid lowering therapy (Grade B)

Rationale

No Value

Errors

No Value

NAME	BIRTH DATE	GENDER	VERSION	LAST UPDATED
------	------------	--------	---------	--------------

✓ VSAC Authenticated

Statin Stuart	1975-01-10	male	DSTU2	5 minutes ago
---------------	------------	------	-------	---------------



Execute CQL

Delete

Normal Norma	1966-12-05	female	DSTU2	6 minutes ago
--------------	------------	--------	-------	---------------



Execute CQL

Delete



CDS Authoring Tool: Testing

NAME	BIRTH DATE	GENDER	VERSION	LAST UPDATED	✓ VSAC Authenticated		
Statin Stuart	1975-01-10	male	DSTU2	5 minutes ago		Execute CQL	Delete
Normal Norma	1966-12-05	female	DSTU2	6 minutes ago		Execute CQL	Delete
High CVD Risk Henry	1975-01-10	male	DSTU2	7 minutes ago		Execute CQL	Delete

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CDS Authoring Tool: Testing

Execute CQL

Executing on Patient:

Name: Normal Norma

Statin Use Demo

Cancel

Execute CQL



CDS Authoring Tool: Testing

CQL Execution Results


Patient: Normal Norma
Artifact: Statin Use Demo

MeetsInclusionCriteria	×
MeetsExclusionCriteria	×
Recommendation	No Value
Rationale	No Value
Errors	Cannot provide a recommendation due to missing data in the patient record

NAME	BIRTH DATE	GENDER	VERSION	LAST UPDATED	✓ VSAC Authenticated		
Statin Stuart	1975-01-10	male	DSTU2	6 minutes ago		Execute CQL	Delete
Normal Norma	1966-12-05	female	DSTU2	7 minutes ago		Execute CQL	Delete

CDS Authoring Tool: Testing

NAME	BIRTH DATE	GENDER	VERSION	LAST UPDATED	✓ VSAC Authenticated		
Statin Stuart	1975-01-10	male	DSTU2	6 minutes ago		Execute CQL	Delete
Normal Norma	1966-12-05	female	DSTU2	7 minutes ago		Execute CQL	Delete
High CVD Risk Henry	1975-01-10	male	DSTU2	8 minutes ago		Execute CQL	Delete

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---	--	---



CDS Authoring Tool: Testing

Execute CQL

Executing on Patient:

Name: Statin Stuart

Statin Use Demo

Cancel

Execute CQL



CDS Authoring Tool: Testing

CQL Execution Results

Patient: Statin Stuart
Artifact: Statin Use Demo

MeetsInclusionCriteria	✓
MeetsExclusionCriteria	✓
Recommendation	No Value
Rationale	No Value
Errors	Recommendation not provided since patient meets exclusion criteria

NAME	BIRTH DATE	GENDER	VERSION	LAST UPDATED	✓ VSAC Authenticated		
Statin Stuart	1975-01-10	male	DSTU2	6 minutes ago		Execute CQL	Delete
Normal Norma	1966-12-05	female	DSTU2	7 minutes ago		Execute CQL	Delete



CQL Services



CQL Services

The screenshot shows the GitHub repository page for **AHRQ-CDS / AHRQ-CDS-Connect-CQL-SERVICES**. The repository has 4 watchers, 2 stars, and 1 fork. It contains 84 commits, 1 branch, 0 releases, and 2 contributors, licensed under Apache-2.0. The description states that the tool is part of the CDS Connect project, sponsored by AHRQ, and developed under contract with AHRQ by MITRE's CAMH FFRDC. It is an Express.js application for exposing CQL CDS through custom RESTful APIs and CDS Hooks APIs. The repository includes tags for `cds`, `cql`, `fhir`, `clinical-decision-support`, `clinical-quality-language`, `smart-on-fhir`, and `cds-hooks`. The commit history shows a merge by `cmoesel` and three recent files: `bin`, `docs`, and `lib`, all created 5 months ago.

AHRQ-CDS / AHRQ-CDS-Connect-CQL-SERVICES Watch 4 Star 2 Fork 1

Code Issues 0 Pull requests 0 Projects 0 Insights

The AHRQ CDS CQL Services tool is part of the CDS Connect project <https://cds.ahrq.gov/>, sponsored by the Agency for Healthcare Research and Quality (AHRQ), and developed under contract with AHRQ by MITRE's CAMH FFRDC. The CQL Services tool is an Express.js application for exposing CQL CDS through custom RESTful APIs and CDS Hooks APIs. <https://cds.ahrq.gov/CDSconnect>

cds cql fhir clinical-decision-support clinical-quality-language smart-on-fhir cds-hooks

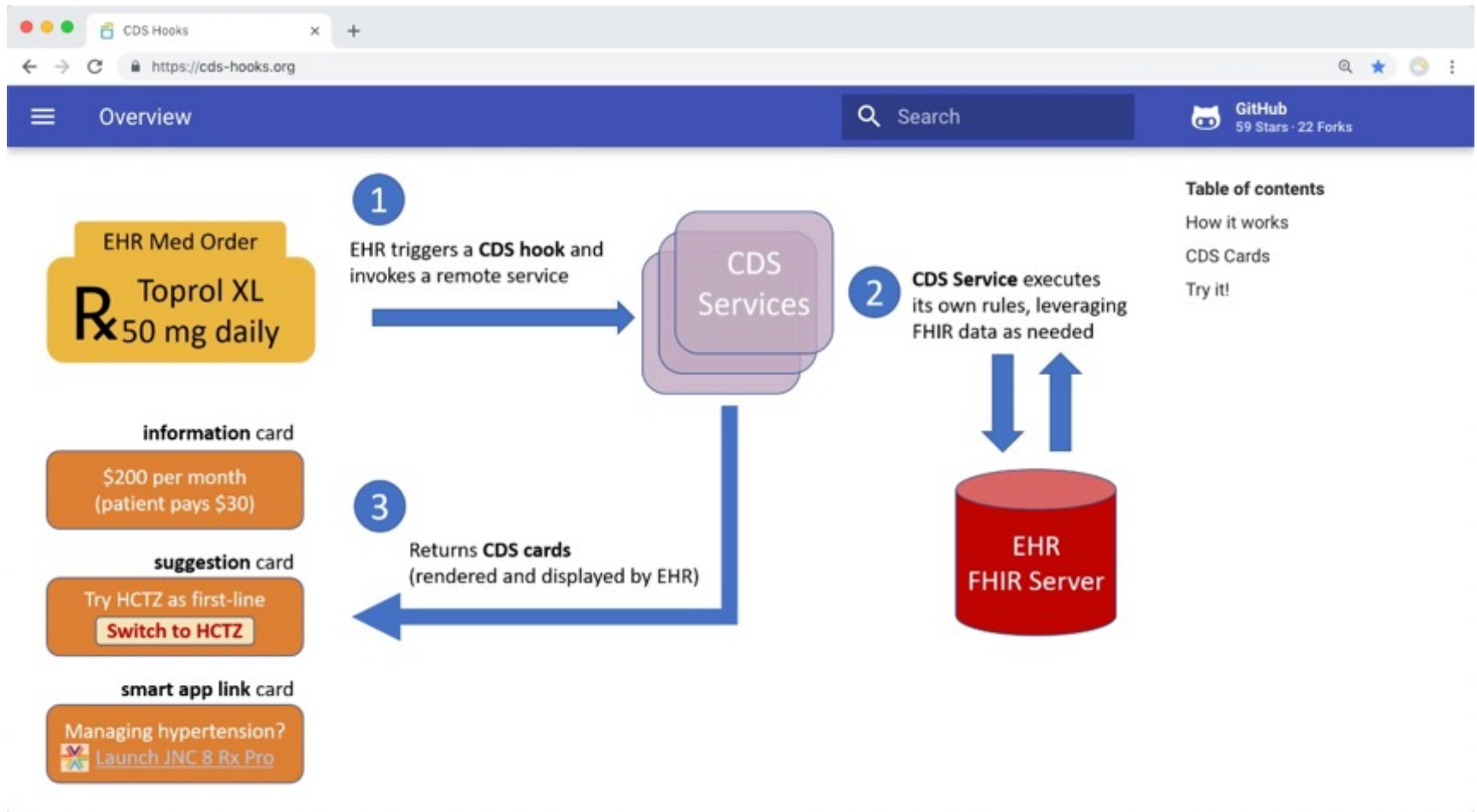
84 commits 1 branch 0 releases 2 contributors Apache-2.0

Branch: master New pull request Find file Clone or download

cmoesel Merge branch 'prod_release' into 'master' Latest commit 451311a on Aug 10, 2018

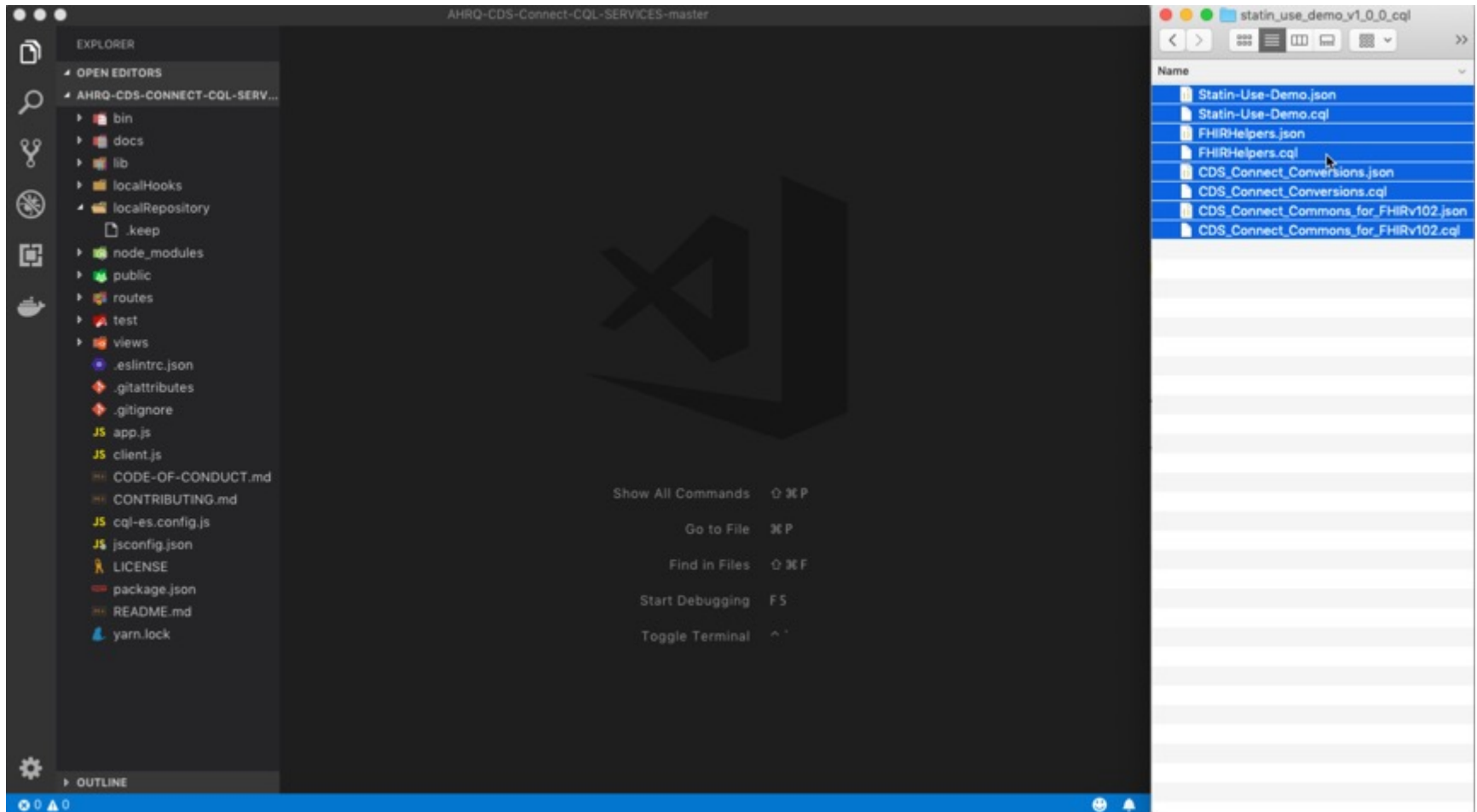
bin	Create code cache folder if it doesn't exist	5 months ago
docs	Unit Tests for Services	5 months ago
lib	Unit Tests for Services	5 months ago

CQL Services: CDS Hooks

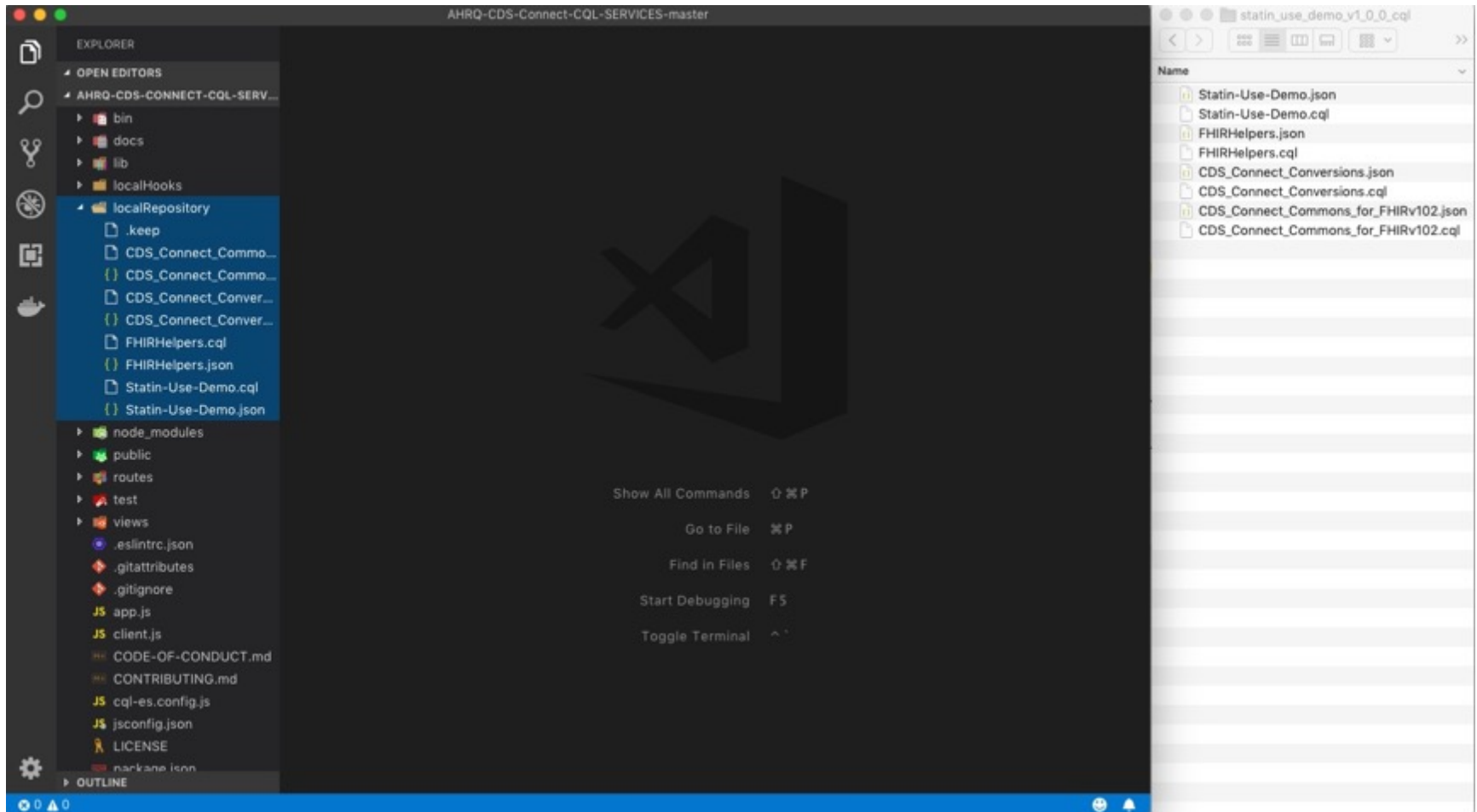




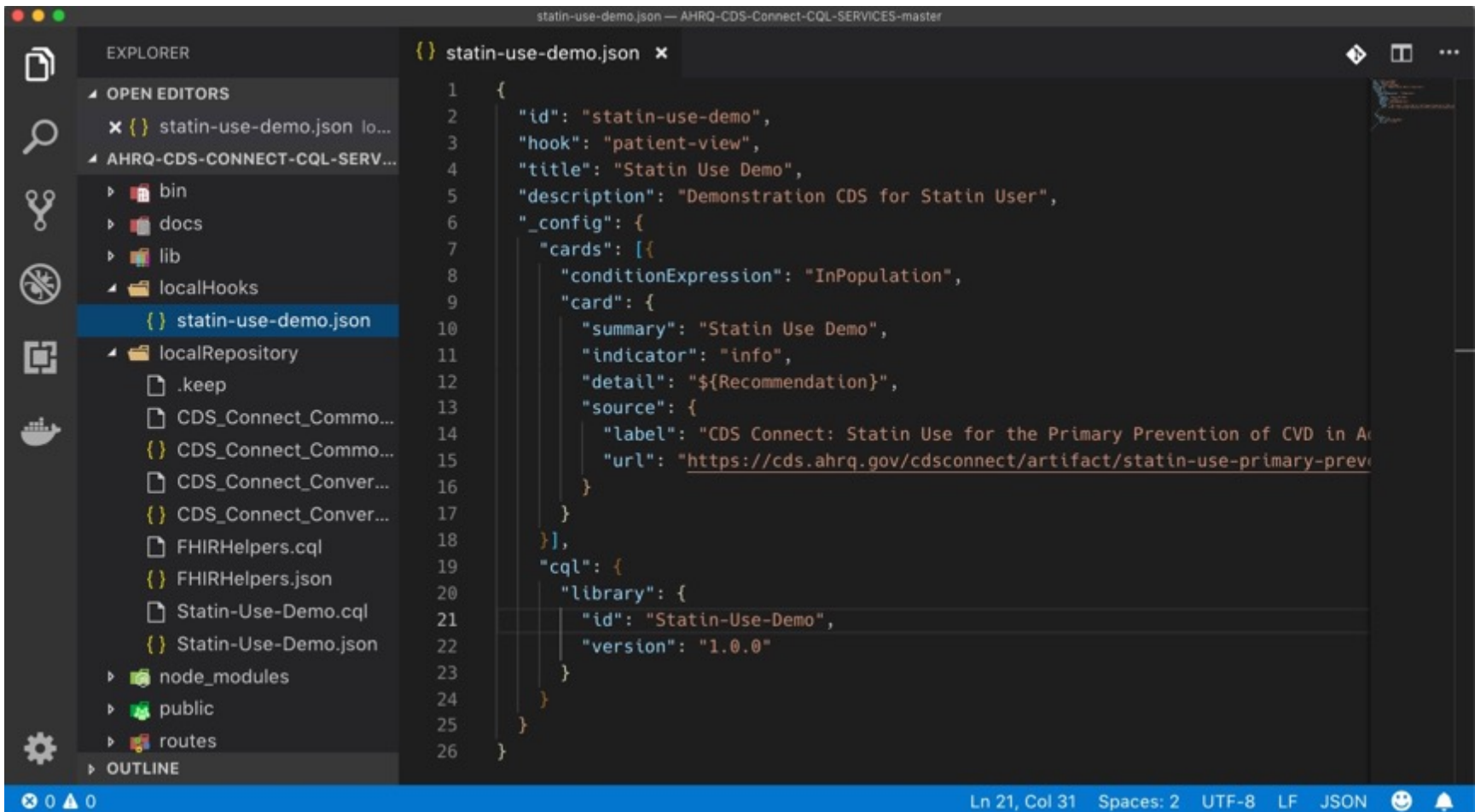
CQL Services: Configuration



CQL Services: Configuration



CQL Services: Configuration

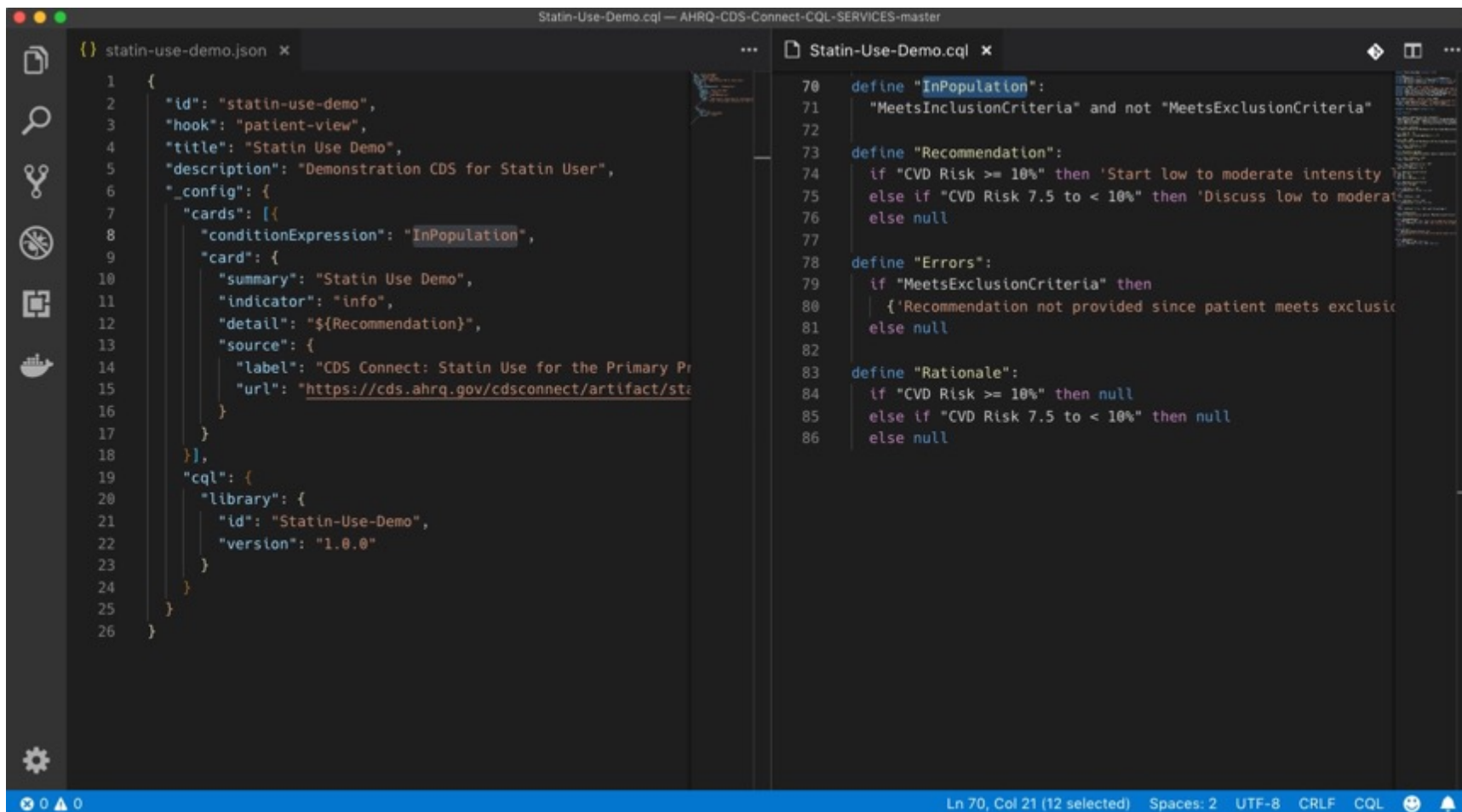


The screenshot shows a Visual Studio Code editor window with the file `statin-use-demo.json` open. The Explorer sidebar on the left shows the project structure, including a `localRepository` folder containing various CQL files and JSON configurations. The main editor area displays the JSON content of `statin-use-demo.json`, which is a configuration for a CQL service named "Statin Use Demo".

```
{
  "id": "statin-use-demo",
  "hook": "patient-view",
  "title": "Statin Use Demo",
  "description": "Demonstration CDS for Statin User",
  "_config": {
    "cards": [{
      "conditionExpression": "InPopulation",
      "card": {
        "summary": "Statin Use Demo",
        "indicator": "info",
        "detail": "${Recommendation}",
        "source": {
          "label": "CDS Connect: Statin Use for the Primary Prevention of CVD in Ac",
          "url": "https://cds.ahrq.gov/cdsconnect/artifact/statin-use-primary-preve"
        }
      }
    }],
    "cql": {
      "library": {
        "id": "Statin-Use-Demo",
        "version": "1.0.0"
      }
    }
  }
}
```

The status bar at the bottom indicates the current position is Line 21, Column 31, with 2 spaces, UTF-8 encoding, LF line endings, and JSON format.

CQL Services: Configuration



```

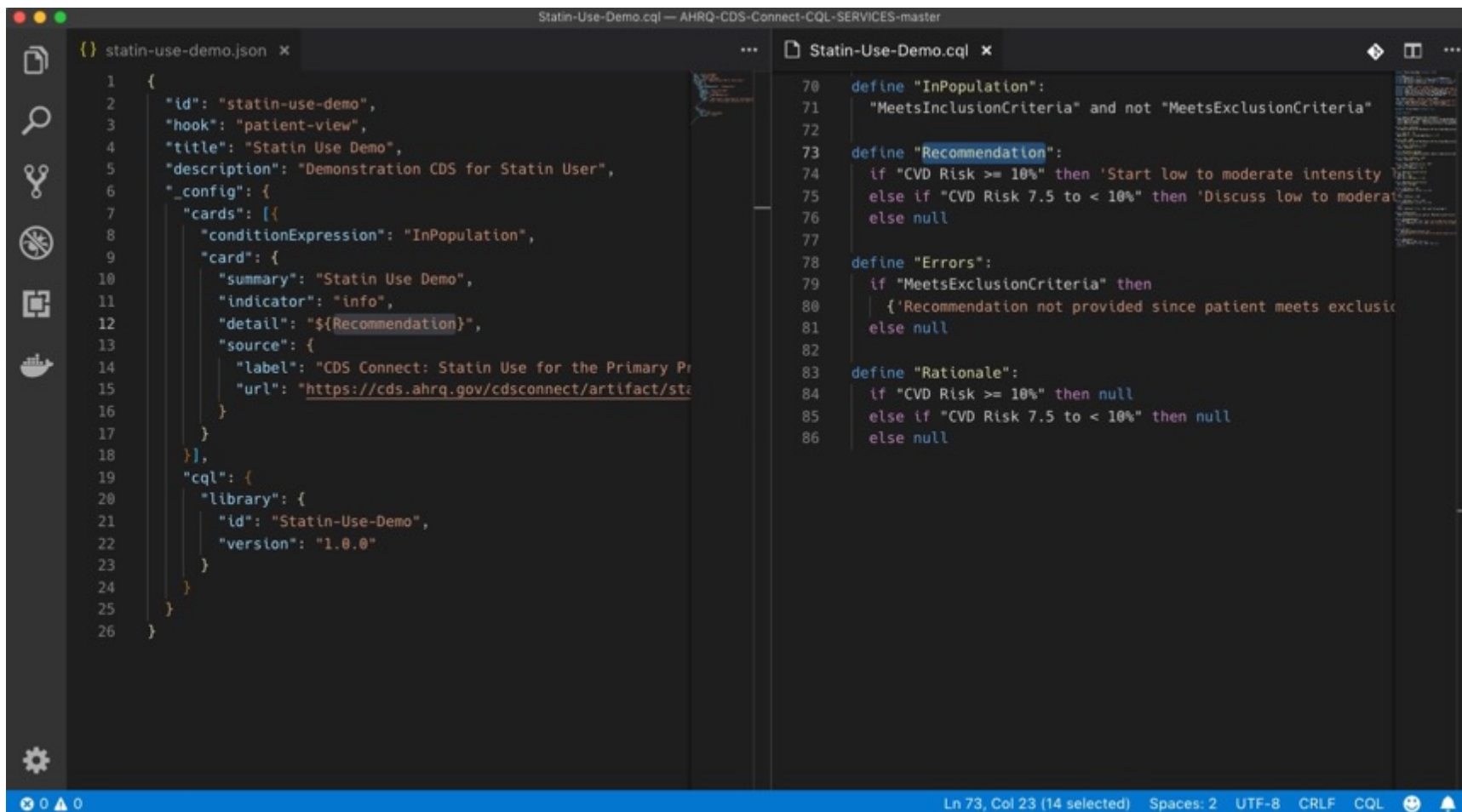
1  {
2    "id": "statin-use-demo",
3    "hook": "patient-view",
4    "title": "Statin Use Demo",
5    "description": "Demonstration CDS for Statin User",
6    "_config": {
7      "cards": [{
8        "conditionExpression": "InPopulation",
9        "card": {
10         "summary": "Statin Use Demo",
11         "indicator": "info",
12         "detail": "${Recommendation}",
13         "source": {
14           "label": "CDS Connect: Statin Use for the Primary Pr
15           "url": "https://cds.ahrq.gov/cdsconnect/artifact/st
16         }
17       }
18     ]},
19     "cql": {
20       "library": {
21         "id": "Statin-Use-Demo",
22         "version": "1.0.0"
23       }
24     }
25   }
26 }
  
```

```

70  define "InPopulation":
71    "MeetsInclusionCriteria" and not "MeetsExclusionCriteria"
72
73  define "Recommendation":
74    if "CVD Risk >= 10%" then 'Start low to moderate intensity
75    else if "CVD Risk 7.5 to < 10%" then 'Discuss low to moderat
76    else null
77
78  define "Errors":
79    if "MeetsExclusionCriteria" then
80      {'Recommendation not provided since patient meets exclusi
81    else null
82
83  define "Rationale":
84    if "CVD Risk >= 10%" then null
85    else if "CVD Risk 7.5 to < 10%" then null
86    else null
  
```

Ln 70, Col 21 (12 selected) Spaces: 2 UTF-8 CRLF CQL

CQL Services: Configuration



```

1  {
2    "id": "statin-use-demo",
3    "hook": "patient-view",
4    "title": "Statin Use Demo",
5    "description": "Demonstration CDS for Statin User",
6    "_config": {
7      "cards": [{
8        "conditionExpression": "InPopulation",
9        "card": {
10         "summary": "Statin Use Demo",
11         "indicator": "info",
12         "detail": "${Recommendation}",
13         "source": {
14           "label": "CDS Connect: Statin Use for the Primary Pr
15           "url": "https://cds.ahrq.gov/cdsconnect/artifact/st
16         }
17       }
18     ]},
19     "cql": {
20       "library": {
21         "id": "Statin-Use-Demo",
22         "version": "1.0.0"
23       }
24     }
25   }
26 }
  
```

```

70  define "InPopulation":
71    "MeetsInclusionCriteria" and not "MeetsExclusionCriteria"
72
73  define "Recommendation":
74    if "CVD Risk >= 10%" then 'Start low to moderate intensity
75    else if "CVD Risk 7.5 to < 10%" then 'Discuss low to moderat
76    else null
77
78  define "Errors":
79    if "MeetsExclusionCriteria" then
80      {'Recommendation not provided since patient meets exclusi
81    else null
82
83  define "Rationale":
84    if "CVD Risk >= 10%" then null
85    else if "CVD Risk 7.5 to < 10%" then null
86    else null
  
```

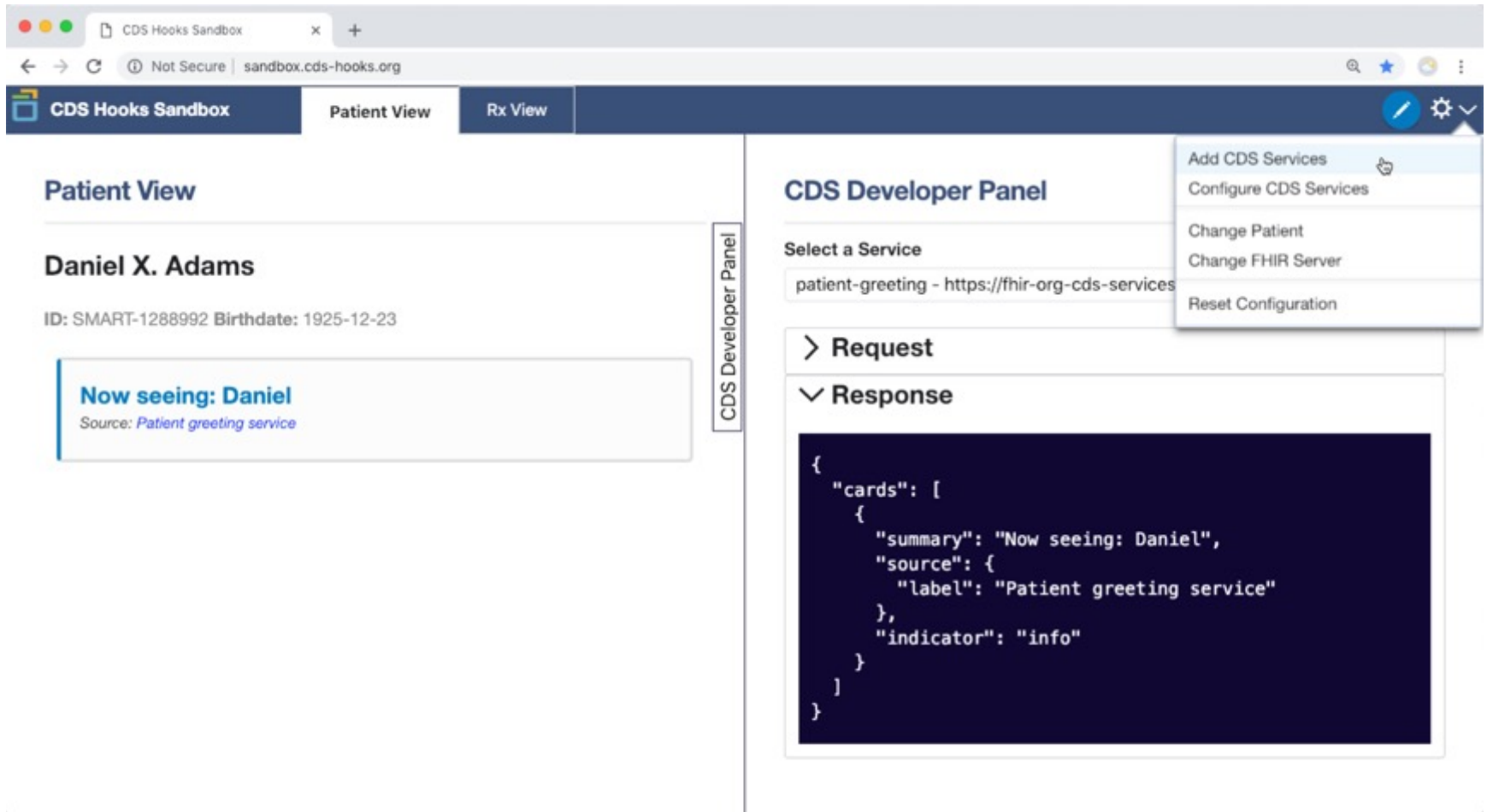
Ln 73, Col 23 (14 selected) Spaces: 2 UTF-8 CRLF CQL



CQL Services: Run

```
AHRQ-CDS-Connect-CQL-SERVICES-master $ yarn start
yarn run v1.12.3
$ node ./bin/www
█
```

CQL Services: CDS Hooks Sandbox



The screenshot displays the CDS Hooks Sandbox web application. The browser address bar shows the URL `sandbox.cds-hooks.org`. The application has a dark blue header with the "CDS Hooks Sandbox" logo and two tabs: "Patient View" (active) and "Rx View".

Patient View

Daniel X. Adams

ID: SMART-1288992 Birthdate: 1925-12-23

Now seeing: Daniel
Source: *Patient greeting service*

CDS Developer Panel

Select a Service
patient-greeting - <https://fhir-org-cds-services>

Request

Response

```
{
  "cards": [
    {
      "summary": "Now seeing: Daniel",
      "source": {
        "label": "Patient greeting service"
      },
      "indicator": "info"
    }
  ]
}
```

A dropdown menu is open in the top right corner of the CDS Developer Panel, showing the following options:

- Add CDS Services
- Configure CDS Services
- Change Patient
- Change FHIR Server
- Reset Configuration

CQL Services: CDS Hooks Sandbox

CDS Hooks Sandbox Patient View Rx View

Patient View

Daniel X. Adams

ID: SMART-1288992 Birthdate: 1925-12-2

Now seeing: Daniel
Source: Patient greeting service

Add CDS Services X

* Enter discovery endpoint url

http://localhost:3000/cds-services

Note: See [documentation](#) for more details regarding the Discovery endpoint.

Save Cancel

CQL Services: CDS Hooks Sandbox

CDS Hooks Sandbox

Patient View

Rx View

Patient View

Daniel X. Adams

ID: SMART-1288992 Birthdate: 1925-12-23

Now seeing: Daniel

Source: Patient greeting service

CDS Developer Panel

CDS Developer Panel

Select a Service

patient-greeting - https://fhir-org-cds-services

> Request

< Response

```
{
  "cards": [
    {
      "summary": "Now seeing: Daniel",
      "source": {
        "label": "Patient greeting service"
      },
      "indicator": "info"
    }
  ]
}
```

⌵

⚙

⌵

Add CDS Services

Configure CDS Services

Change Patient

Change FHIR Server

Reset Configuration



CQL Services: CDS Hooks Sandbox

Configure CDS Services

<https://fhir-org-cds-services.appspot.com/cds-services/cms-price-check>

☒ Enabled? Delete

```
{  "id": "cms-price-check",  "title": "CMS Pricing Service",  "description": "Determine if an authored prescription has a cheaper alternative to switch to and display pricing",  "hook": "medication-prescribe",  "enabled": true}
```

<http://localhost:3000/cds-services/statin-use-demo>

☒ Enabled? Delete

```
{  "id": "statin-use-demo",  "hook": "patient-view",  "title": "Statin Use Demo",  "description": "Demonstration CDS for Statin User",  "prefetch": {    "Patient": "Patient/{{context.patientId}}",    "MedicationOrder": "MedicationOrder?patient={{context.patientId}}",    "Observation": "Observation?patient={{context.patientId}}"  },  "enabled": true}
```

Cancel

CQL Services: CDS Hooks Sandbox

CDS Hooks Sandbox

Patient View

Rx View

Patient View

Daniel X. Adams
ID: SMART-1288992 Birthdate: 1925-12-23

Now seeing: Daniel
Source: Patient greeting service

CDS Developer Panel

CDS Developer Panel

Select a Service

✓ patient-greeting - https://fhir-org-cds-services.appspot.com/cds-services/patient-gree
statin-use-demo - http://localhost:3000/cds-services/statin-use-demo

> Request

✓ Response

```
{
  "cards": [
    {
      "summary": "Now seeing: Daniel",
      "source": {
        "label": "Patient greeting service"
      },
      "indicator": "info"
    }
  ]
}
```






CQL Services: CDS Hooks Sandbox

CDS Hooks Sandbox

Patient View

Rx View



Patient View

Daniel X. Adams

ID: SMART-1288992 Birthdate: 1925-12-23

Now seeing: Daniel

Source: Patient greeting service

CDS Developer Panel

CDS Developer Panel

Select a Service

statin-use-demo - http://localhost:3000/cds-services/statin-use-demo

> Request

▼ Response

```
{  
  "cards": []  
}
```



CQL Services: CDS Hooks Sandbox

CDS Hooks Sandbox

Patient ViewRx View

Patient View

Daniel X. Adams

ID: SMART-1288992 Birthdate: 1925-12-23

Now seeing: Daniel

Source: Patient greeting service

CDS Developer Panel

CDS Developer Panel

Select a Service

statin-use-demo - http://localhost:3000/cds-s

> Request

< Response

```
{
  "cards": []
}
```

Add CDS Services

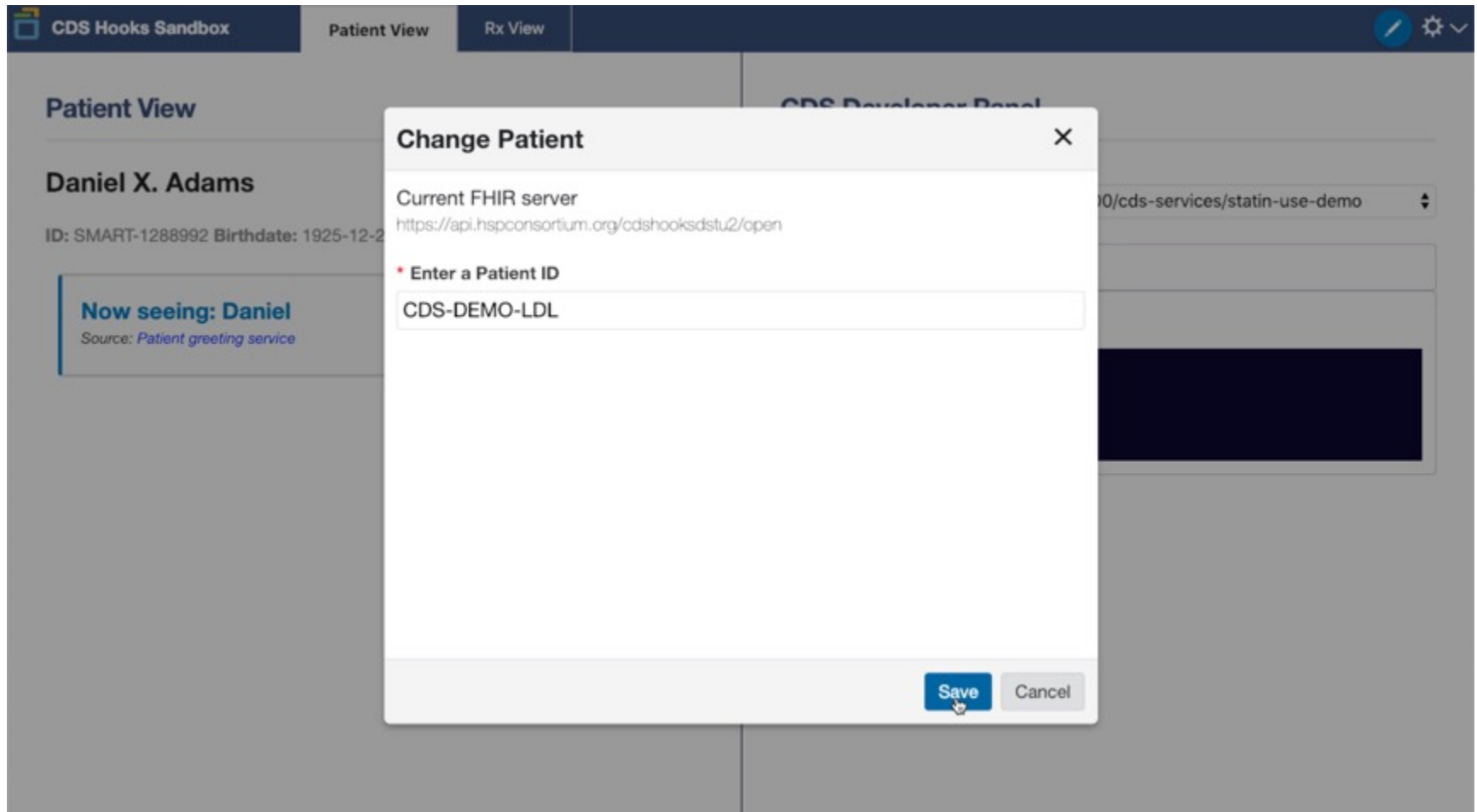
Configure CDS Services

Change Patient

Change FHIR Server

Reset Configuration

CQL Services: CDS Hooks Sandbox



The screenshot displays the 'CDS Hooks Sandbox' application interface. The top navigation bar includes 'CDS Hooks Sandbox', 'Patient View', and 'Rx View'. The 'Patient View' tab is active, showing patient information for 'Daniel X. Adams' with ID 'SMART-1288992' and birthdate '1925-12-2'. A status box indicates 'Now seeing: Daniel' from the 'Patient greeting service'. A 'Change Patient' dialog box is open in the center, featuring a close button (X) in the top right. The dialog contains the text 'Current FHIR server' with the URL 'https://api.hspconsortium.org/cdshooksdstu2/open'. Below this, a red asterisk indicates a required field 'Enter a Patient ID', which is filled with the text 'CDS-DEMO-LDL'. At the bottom of the dialog are 'Save' and 'Cancel' buttons. In the background, a dropdown menu shows '0/cds-services/statin-use-demo'.

CQL Services: CDS Hooks Sandbox

CDS Hooks Sandbox

Patient View

Rx View

Now seeing: Leslie

Source: Patient greeting service

Statin Use Demo

Source: CDS Connect: Statin Use for the Primary Prevention of CVD in Adults

Start low to moderate intensity lipid lowering therapy (Grade B)

CDS Developer Panel

CDS Developer Panel

Select a Service

statin-use-demo - http://localhost:3000/cds-services/statin-use-demo

> Request

< Response

```
{
  "cards": [
    {
      "summary": "Statin Use Demo",
      "indicator": "info",
      "detail": "Start low to moderate intensity lipid lowering therapy (Grade B)",
      "source": {
        "label": "CDS Connect: Statin Use for the Primary Prevention of CVD in Adults",
        "url": "https://cds.ahrq.gov/cdsconnect/artifact/1.0.0/primary-prevention-cvd-adults"
      }
    }
  ]
}
```



Contact Info

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 - cmoesel@mitre.org



Questions